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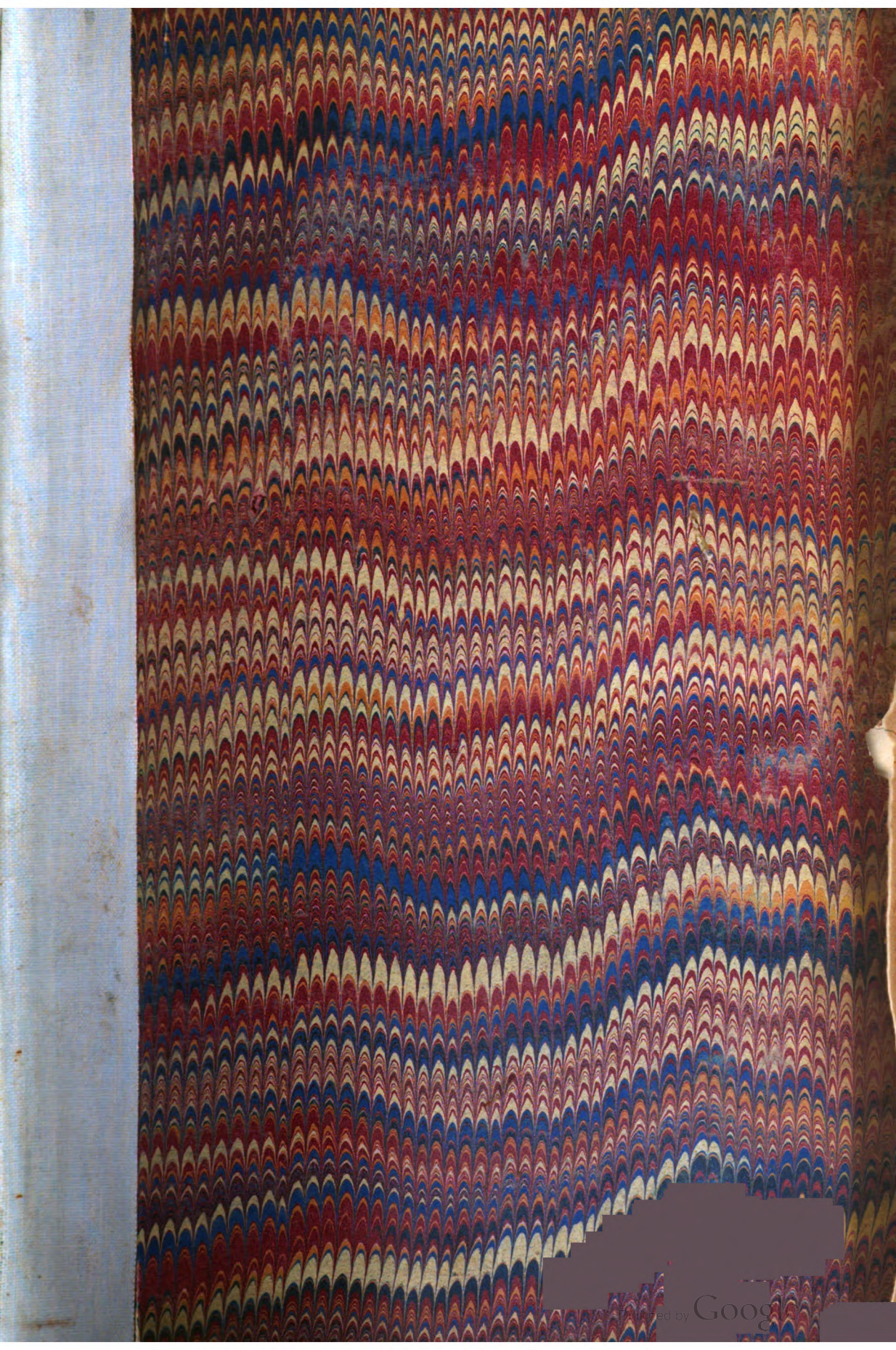


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AMERICAN CYCLOPÆDIA.

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VOL. XIV.  
REED-SPIRE.





THE NEW  
AMERICAN CYCLOPÆDIA:

A

Popular Dictionary

OF

GENERAL KNOWLEDGE.

EDITED BY

GEORGE RIPLEY AND CHARLES A. DANA.

VOLUME XIV.

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## REED

**REED**, the name of gramineous plants of the genera *phragmites* and *arundo*. The common reed (*phragmites communis*, Trinius) is a fine showy grass growing in overflowed grounds, and not uncommon on the edge of deep muddy-bottomed ponds in eastern New England. It has an annual stem (culm), attaining a height of 8 to 12 feet, and very erect and smooth; its leaves are 1 to 2 feet long, broad, flat, and pointed, so that a group of plants at a little distance resembles a field of maize. The genus *phragmites* was distinguished from the Linnæan *arundo* on account of its flowers, the lower floret of the spikelet being barren and the flower stalk (*rachis*) being fringed with silky hairs. The roots of the common reed are perennial, and extend laterally, forming entangled and thick masses. On the banks of the Thames in England, the plant is encouraged to cover embankments, as the running roots strengthen the river walls, and prevent their wasting away by the action of the stream. The culms make the very best thatch for covering roofs of buildings or in the construction of screens and mats used in protecting hot-beds in kitchen gardens, and even in forming a substratum in plaster floors. The flower spikes will dye wool green, and the roots are reputed to be diuretic and diaphoretic. The reed is common to both hemispheres, and is widely distributed.—The cultivated reed (*arundo donax*, Willd.) is common in the south of France and Italy, where it is artificially raised for use as fence wood, for supporting the vine, for fishing rods, and for many other purposes; a variety with variegated leaves was once considered an ornamental plant in gardens. The *arundo tecta* and *gigantea* of Walter are southern plants, now known as belonging to the genus *arundinaria* of Michaux; the latter is called the cane, with arborescent culms 10 to 20 feet high, rigid and simple the first year, then branching, and, after fruiting at indefinite periods, decaying; it is found on the banks of the larger rivers from North Carolina to Florida. The former is the southern reed, with culms 2 to 10 feet high; linear lanceolate leaves, acuminate, roughish; spikelets solitary or in a simple raceme at the summit of the branches, or frequently on leaf-

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less radical culms. It flowers in February and March, and grows in swamps from North Carolina to Florida. The sea reed (*ammophila arundinacea*, Roth.) is common to Europe and the United States, and is found useful in resisting the shifting of sand upon sea beaches.—Other grasses have the trivial name of reed, such as the reed bent grass (*calamagrostis*), of which several species are common to this country.

**REED, HENRY**, an American author, born in Philadelphia, July 11, 1808, died Sept. 27, 1854. He was graduated at the university of Pennsylvania in 1825, and began the study of law in the office of John Sargent in Philadelphia. In 1829 he was admitted to the bar; in 1831 was elected assistant professor of English literature in his university, and shortly after assistant professor of moral philosophy; and in 1835 was elected professor of rhetoric and English literature in the same institution. In the spring of 1854 he visited Europe, and upon his return voyage was lost in the steamer Arctic. He wrote the life of his grandfather, Joseph Reed, in Sparks's "American Biography;" "Lectures on English Literature from Chaucer to Tennyson" (1855); "Lectures on English History, Shakespeare," &c. (1856); and "Lectures on the British Poets" (1857). He long maintained a correspondence with Wordsworth, and after his death he edited the American reprint of his memoirs. He also edited Reid's "Dictionary of the English Language," Graham's "English Synonymes," Arnold's "Lectures on Modern History," Lord Mahon's "History of England," and the "Poetical Works of Thomas Gray," with a new memoir.

**REED, JOSEPH**, an American officer, born in Trenton, N. J., Aug. 27, 1741, died in Philadelphia, March 5, 1785. He was graduated at Princeton college, and commenced the study of law at that place in his 16th year. In 1763 he went to England, where he continued his studies until the troubles produced by the stamp act began, when he returned to Trenton, entered upon the practice of his profession, and in 1767 was appointed deputy secretary of New Jersey. Revisiting England in 1770, he married a daughter of Mr. Dennis De Berdt, agent for the province of Massachusetts Bay, and on

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his return settled at Philadelphia, took an active part on the side of independence in the political struggles of the time, and through his English connections opened a lengthened correspondence on the subject with Lord Dartmouth, secretary for the colonies. In 1774 he was appointed a member of the general committee of Philadelphia, and in Jan. 1775, president of the first provincial convention held in Pennsylvania; and he was a delegate to the continental congress which met in May. On the formation of the army he was appointed aide-camp and secretary to Gen. Washington. In 1776 he was made adjutant-general, and his local knowledge was of great value in the attack at Trenton, and also at Princeton. Early in 1777 he resigned the office of adjutant-general, and was appointed chief justice of Pennsylvania, and named by congress a brigadier-general. He declined both offices, and continued to serve in the army as a volunteer, without rank or pay. He was present at nearly every engagement in the northern and eastern portions of the Union, in some of which he had horses killed under him, but never received a wound. In 1778 he was elected to congress, and signed the articles of confederation. About this time he was approached by one of 3 British commissioners, Gov. Johnstone, with an offer of £10,000 and the most valuable office in the colonies if he would exert himself to promote a reconciliation between Great Britain and the colonies. His answer was: "I am not worth purchasing; but, such as I am, the king of Great Britain is not rich enough to buy me." In the same year he was made president of the supreme executive council of Pennsylvania. While in this position he exerted himself very successfully to suppress an armed insurrection that occurred in Philadelphia; the revolt of the Pennsylvania line was also suppressed mainly by him. His "Life and Correspondence" was published by his grandson, W. B. Reed (2d ed., Philadelphia, 1847).

REED BIRD. See BOBOLINK.

REED INSTRUMENTS, among musical contrivances, a numerous and diverse class, including all those the tones of which are due to vibrations imparted to a body of air in a tube, throat, or chamber, by means of the pulsations of a thin lamina or tongue of wood or metal having one end fixed and the other lying over or within an aperture, and actuated by forcibly directing through this a current of air. Technically, such a lamina is termed a reed. It has two general forms. In the first, seen in the clarinet, the reed is larger than the opening through which the air is to pass, and in pulsating alternately closes and opens it, beating against its margins. This form, among European nations doubtless the earliest known, is distinguished as the beating reed. In the second, seen in the accordion, the dimensions of the reeds are slightly less than those of the aperture, so that, in pulsating in consequence of an impulse and of its own elasticity, it moves

within the current of air only, alternately allowing and interrupting its passage; this is hence termed the free reed. It is proposed to consider in this place only those instruments involving the free reed.—A small, short, metallic tube, containing a single tongue or reed of this form, fitted to yield upon blowing into one end the note A or C, has long been known, and probably first in Germany and Holland, and is termed a pitch pipe. Père Amiot, a French missionary to China, early described the *cheng*, or Chinese organ, a small instrument consisting of a series of tubes, each having its free lamina or tongue, and acted on by the breath of the performer; and this appears to have been in common use in that country from a period so early that its origin is lost. Whether M. Grenié, who in 1810 introduced free reeds into the construction of the organ (see ORGAN), actually reinvented this form of reed, as believed by Biot and others, or whether he adapted it from the pitch pipe, or directly from a knowledge of the Chinese instrument, it may not now be practicable to determine; but in any event, it appears certain that in point of antiquity, and probably of direct origin, the credit of this invention must be awarded to oriental ingenuity. Knight states that the accordion was brought from Germany into England about 1828; but it is quite certain that as early as 1825 instruments upon this principle were known in the United States, stated by some to have been devised by Mr. J. H. Bazin, of Canton, Mass., upon having brought to him (in 1821) a pitch pipe for repairs. This claim must at present be considered doubtful. French accounts refer the accordion to a period previous to 1829. Wherever the free reed may have been first applied to the making of a small or hand instrument, the modifications thence arising, especially between about 1825 and 1835, were in rapid succession and numerous. Among the earliest of these were Wheatstone's melina and concertina, the latter in form of a bellows with two hexagonal faces, on the upper of which were 4 rows of finger stops or studs; by pressing down the latter, air was admitted to act on the corresponding tongues within. The attempts to improve the accordion, by enlarging it and extending its scale, naturally rendered it unwieldy, and thus led to a form of organ with free reeds only, and without pipes, the bellows being worked by the foot. Such was Mr. Green's seraphine, and the French *mélodium* (in England and the United States, *melodeon*), one form of which latter, also termed the harmonium, appears to have been the invention of M. Debain of Paris, and improved by MM. Alexandre, father and son, being still (1861) manufactured by the house established by the elder Alexandre for the making of accordions in 1829. The most improved form of this instrument is in France now known as the *orgue-mélodium*, or *piano Liszt*; in this country, as the Alexandre organ. Other French instruments, of the earlier date

above spoken of, were the *poikilorque* and *symphonium*; of the German, some of which were small, and probably all ephemeral, were the *colophon*, *phys-harmonica*, *ceolo-musicon*, &c. In 1841 Mr. Evans, of Cheltenham, Eng., produced a harmonium of two banks of keys and 2½ octaves of pedals; but the instrument was not brought prominently forward until 1859. The objects of this inventor were to overcome the nasal and harsh quality of tone, and the slow speaking, then characterizing the French and English instruments; and he is said to have produced ultimately a pure tone of fine quality, with rapid utterance, and without loss of power. This is the form of harmonium to be found described in English works. In it the several rows or series of reeds designed to give the different registers or parts in the harmony performed are, as in the Alexandre organ, placed horizontally across the instrument, at the same level, and separated from each other by partitions; the arrangement being such that the particular compartments or series to which the air shall be admitted in performing are determined by the knobs or stops that have been drawn out at the time. (See ORGAN.) In the English, as in the French instruments, also, the tardy response of the reeds to the action of the air is corrected, in most instances, by a device known as the percussion, by which, the proper stop being drawn, the touching of any key instantly causes the blow of a small hammer on the reed, its vibration, thus promptly begun, being then continued by the current of air. In all these forms, moreover, the agitation of the reeds is produced by means of more dense or compressed air forced out of a bellows across the reeds, and acting of course against the ordinary atmospheric pressure on the opposite side; and generally the reeds themselves are placed low in the instrument, often beneath the key board, so that the sound is liable to be somewhat smothered or interfered with in consequence. Some radical improvements were invented by Mr. J. Carhart (see MELODEON), the changes introduced by him having been worked out as early as 1839, and his instruments being manufactured in large numbers, in Buffalo, N. Y., in the year 1846. On the principle of the superior fulness and sweetness of those tones in the accordion made when the air is drawn into the bellows, as compared with those formed by forcing the air out, he so constructed the bellows of the melodeon that it should expel the air from the chamber into which the reed passages opened; this chamber and the space within the bellows freely communicating, and being maintained while playing in the condition of a partial vacuum by means of stout springs, which gradually distend the bellows as often as force has been used to compress and empty it of the entering air. This required that the reeds also should be reversed, the passages admitting air into the exhausted chamber, and the reeds being acted

on by the in-flowing streams of air. As a result of this arrangement, all the registers open directly into the one exhausted chamber; and they are conveniently placed in rows one over the other in the manner of shelves or successive segments, each horizontal row divided in the middle to form two registers. The construction of this part of the instrument finally adopted and now in use is the invention of Mr. E. P. Needham. Again, to open the registers, complicated connections and slides are not required, but simply for each a narrow horizontal door hinged on its lower edge, and directly pulled down by a wire making a single angle with the draw-knob. The chamber being during performance partially exhausted, if the edges of the several upright shelves or segments and of the horizontal doors to the registers are properly adapted and faced with soft leather, the external atmospheric pressure completes the connection of these parts, and secures air-tightness and strength of the whole; while in other instruments the condensed air within operates continually to strain and weaken the connections. Thus, in this instrument, the parts are readily taken apart for repairs, being stayed by pins only, and as quickly put together again; and the reeds are thus directly accessible. The closing of any register is made to open a small valve within it, called a pneumatic stop, by which communication with the exhausted chamber is at once made both above and below the reeds, and the latter are then within the exhausted chamber; but upon opening the register, this valve closes, and thus other communication is cut off above, and the reeds have the exhausted space now only within, the atmosphere acting from without. The touching of any key is made to open (if the instrument have but one bank of keys) the corresponding valve in every register. If then all the registers be open, all the reeds so uncovered are caused by the entering air to sound; if some of the registers only are open, only the reeds in these can sound. With two banks of keys, couplers are required in order to put all the registers at pleasure under command of one. When by couplers the keys have thus been connected with valves in all the registers, the drawing of the knob *grand jeu*, or grand organ, opens all the registers, and affords remarkable power of tone and effect. These arrangements are more common in the larger instruments or harmoniums. By variously curving the reed in an inward direction, its impact upon the air is also modified; and Mr. Carhart was in this way enabled to secure the effect known as voicing, as well as some of the differences of quality required for the different registers. In any reed, the rapidity of vibration, and hence the pitch, depend on several particulars, chiefly the length and weight of the reed, and its relative thickness at the two ends. If the reed is thick at the free end and thin at the fixed, its tone is deep; if the reverse, acute. Hence, the reeds are roughly at-



tuned by giving them certain lengths and thicknesses, and then more accurately by scraping off a little as may be required from the free or the fixed extremity. The Alexandre organ is made of different sizes, the largest corresponding to a 16-foot pipe organ, and by combinations giving 7 octaves. Its usual stops are the English horn and flute, and again the bassoon and hautboy, forming the ordinary diapasons, and answering to the compass from an 8-foot pipe; drone and clarinet, an octave below; clarion and fife, an octave above; 2 forte stops, to increase the volume of sound; a principal, which opens all the stops at once; the two stops first named also actuating the percussion; and two stops, *expression à la main*, and expression of pedals, by which superior power of expression, or swell and diminuendo, is secured by merely varying the pressure of the fingers, or of the feet. With these are sometimes found also the *sourdine*, modifying the tone of certain stops, *voix céleste*, *voix humaine*, *musette*, and *tremolo*.

REES, ABRAHAM, D.D., a British divine and scholar, born at Llanbrynmair, Wales, in 1743, died June 9, 1825. He studied for the ministry at Hoxton academy, where he was appointed tutor in his 19th year, which position he retained for more than 22 years. In 1768 he became also pastor of a Presbyterian congregation in Southwark, and in 1783 in the Old Jewry. From 1786 to 1795 he was also president of the dissenting academy at Hackney. Many of his sermons were published at intervals, and he contributed to the "Monthly Review." In 1776 he was engaged to edit a new edition of Chambers's "Cyclopædia," which was completed in 1786 (4 vols. fol.); and that work having proved very successful, he began in 1802 the publication of "Rees's Cyclopædia," which was completed in 45 vols. 4to. in 1819.

REEVE. See RUFF.

REEVE, CLARA, an English novelist, born in Ipswich in 1738, died there in Dec. 1808. She was the daughter of the Rev. William Reeve, rector of Treston and of Kerton in Suffolk, and perpetual curate of St. Nicholas, and studied under her father. Her first literary work was a translation from the Latin of Barclay's romance of *Argenis*, which she published in 1762, under the title of "The Phœnix;" and in 1767 appeared her "Champion of Virtue," afterward called "The Old English Baron," the work upon which her reputation now almost exclusively rests. This tale was written in imitation of Walpole's "Castle of Otranto," of which romance Miss Reeve was a great admirer. Its success prompted her to devote herself more closely to literary pursuits, and she produced successively "The Two Mentors," "The Progress of Romance," "The Exile," "The School for Widows," "Plans of Education," and "Memoirs of Sir Roger de Clarendon." Her works were very popular in her time, but they are now forgotten with the exception of her first novel.

REEVE, TAPPING, an American lawyer, born

in Brookhaven, Long island, in Oct. 1744, died in Litchfield, Conn., Dec. 13, 1823. He was graduated at Princeton college in 1763, and 9 years after removed to Litchfield, Conn., where he began the practice of law. In 1784 he instituted the Litchfield law school, which soon became celebrated throughout the Union, and of which he was the sole instructor until 1798, when he associated with him James Gould, continuing to give lectures himself until 1820. He was a judge of the superior court from 1798 to 1814. In politics he was a federalist; and he was the first eminent lawyer in America who labored to effect a change in the laws regarding the property of married women.

REFERENCE. See ARBITRATION.

REFLECTORS. See BURNING MIRRORS.

REFORMATION, the historical name for the great religious movement of the 16th century, which divided the Latin Catholic church into two opposing sections, and resulted, after many theological, political, and social struggles and convulsions, in the establishment of the various ecclesiastical organizations of evangelical or Protestant Christendom. Originating in the 16th century and in the heart of Europe, its spirit has controlled the history of the Teutonic races ever since, has shaped the modern institutions and fortunes of Germany, Scandinavia, Holland, England, and Scotland, and has made its influence felt in all parts of the globe.—There were many "reformers before the reformation," and almost every doctrine of Luther had its advocates long before him. The whole struggling of mediæval Catholicism toward reform and liberty; the reformatory councils of Pisa, Constance, and Basel; the long continued conflict between the German emperors and the popes; the spiritualistic piety and theology of the mystics of the 14th and 15th centuries; the Waldenses and Albigenes in France and northern Italy; the revival of letters and classical learning under the direction of Agricola, Reuchlin, and Erasmus; the rise of the national languages and letters in connection with the feeling of national independence; the invention of the printing press; Wycliffe and the Lollards in England, Huss and the Hussites in Bohemia, Savonarola with his politico-religious reform movement, and Arnold of Brescia, in Italy; the theological writings of Wesel, Goch, and Wessel in Germany and the Netherlands; all these and many similar persons and movements were so many preparations, negative or positive, direct or indirect, for the reformation of the 16th century. It is freely admitted that various secondary causes, and among them many bad men and motives, had their full share in the progress of the reformation, as they sometimes had in the first introduction of Christianity itself among heathen nations. It is equally true that the reformation gave rise to various radical and fanatical movements in theology, religion, and politics; but these are the excrescences, the morbid extremes and caricatures of Protestantism, against which its true genius al-

ways protests and reacts. Finally it should be remembered that Protestantism never claimed infallibility and perfection, and is always open to further improvement and progress on the basis of the Word of God.—We now proceed to the general principles of the reformation as held to this day, in their acknowledged standards, by all the Protestant churches to which it gave rise. The reformation was originally neither a political nor a philosophical nor a literary, but a religious and ecclesiastical movement. It started with the practical question: How can the troubled conscience find pardon and peace and become sure of personal salvation? It retained from the Catholic system all the objective doctrines of Christianity concerning the Holy Trinity and the divine human character and work of Christ—in fact, all the articles of faith contained in the apostles' and other œcumenical creeds of the early church. But it joined issue with the prevailing system of religion in soteriology, or in the doctrines relating to subjective experimental Christianity, especially the justification of the sinner before God, the true character of faith, good works, the rights of conscience, and the rule of faith. It asserted the principle of evangelical freedom as laid down in the epistles of Paul to the Romans and Galatians, in opposition to the system of an outward legalistic authority which held the individual conscience and private judgment bound. It brought the believer into a direct relation and union with Christ as the one and all-sufficient source of salvation, in opposition to traditional ecclesiasticism, and priestly and saintly intercession. The Protestant goes directly to the Word of God for instruction, and to the throne of grace in his devotions; while the pious Catholic always consults the teaching of his church, and often prefers to offer his prayers through the medium of the Virgin Mary and the saints. Schleiermacher states the difference between Catholicism and Protestantism in the formula: "Catholicism makes the believer's relation to Christ depend upon his relation to the church; Protestantism makes the relation of the believer to the church depend upon his relation to Christ." In other words, Catholicism gets to Christ through the church, Protestantism gets to the church through Christ; the former proceeds from the body to the head, the latter from the head to the body; with the one churchliness is the measure of christliness, with the other the degree of christliness determines and conditions the character and value of churchliness. From this general principle of evangelical freedom and direct individual relationship of the believer to Christ proceed the two fundamental doctrines of Protestantism, the absolute supremacy of the word of Christ, and the absolute supremacy of the grace of Christ. The one is called the formal principle, or *principium cognoscendi*; the other the material principle, or *principium essendi*. The former proclaims the canonical Scriptures (to the exclusion of the

Apocrypha of the Old Testament), and more particularly the word of Christ and the apostles, to be the only and sufficient infallible source and rule of faith and practice, and asserts the right of private interpretation of the same; in distinction from the Roman Catholic view, which declares the Bible and tradition or church authority to be two coördinate sources and rules of faith, and makes tradition, especially the decrees of popes and councils, the only legitimate and infallible interpreter of the Bible. In its extreme form Chillingworth expressed this principle of the reformation in the well known formula: "The Bible, I say, the Bible only, is the religion of Protestants." Genuine Protestantism, however, by no means despises or rejects tradition and church authority as such, but only subordinates it to and measures its value by the Bible, and believes in a progressive interpretation of the Bible through the expanding and deepening consciousness of Christendom. Hence, beside having its own symbols or standards of public doctrine, it retained all the articles of the ancient Catholic creeds and a large amount of disciplinary and ritual tradition, and rejected only those doctrines and ceremonies of the Catholic church for which it found no clear warrant in the Bible, or which it thought contradicted its letter or spirit. The Calvinistic branches of Protestantism went further in their antagonism to the received traditions than the Lutheran and the Anglican reformation; but all united in rejecting the authority of the pope (Melancthon for a while was willing to concede this, but only *jure humano*, as a limited disciplinary superintendency of the church), the meritoriousness of good works, the indulgences, the worship of the holy Virgin and of the saints and relics, the 7 sacraments with the exception of baptism and the eucharist, the dogma of transubstantiation and the sacrifice of the mass, purgatory and prayers for the dead, and the use of the Latin language in public worship, for which the use of the vernacular languages was substituted. The other fundamental doctrine of the reformation has reference to the personal appropriation of the Christian salvation, and has for its object to give all glory to Christ by declaring that the sinner is justified before God, *i. e.*, acquitted of guilt and declared righteous, solely on the ground of the all-sufficient merit of Christ as apprehended by a living faith; in opposition to the theory, then prevalent and substantially sanctioned by the council of Trent, which makes faith and good works the two coördinate sources of justification. Genuine Protestantism does not, on that account, by any means reject or depreciate good works; it only denies their value as sources or conditions of justification, but insists on them as the necessary fruits of faith and evidence of justification. To these two prominent principles of the reformation, which materially affect its theology and religious life, must be added a third, the doctrine of the universal priesthood of be-

lievers, and the right and duty of the laity not only to read the Bible in the vernacular tongue, but also to take part in the government and all the public affairs of the church.—We now present an outline of the history of the reformation in the various countries in which it finally succeeded, leaving out Bohemia, Italy, and Spain, where it was suppressed by the combined opposition of the secular and ecclesiastical authorities. I. THE REFORMATION IN GERMANY was directed by the genius and energy of Luther, the learning and moderation of Melancthon, assisted by the princes, especially the electors of Saxony, and sustained by the majority of the people in spite of the opposition of the bishops and the imperial government. It commenced in the university of Wittenberg with the protest against the traffic in indulgences, Oct. 31, 1517 (ever since celebrated in Protestant Germany as the festival of the reformation), and soon became a powerful popular movement. At first it moved within the bosom of Catholicism. Luther shrunk in holy horror from the idea of a separation from the religion of his fathers. He only attacked a few abuses, taking it for granted that the pope himself would condemn them if properly informed. But the irresistible logic of events carried him step by step far beyond his original intentions, and brought him into irreconcilable conflict with the central authority of the church. Pope Leo X., in June, 1520, pronounced the sentence of excommunication against Luther, who burned the bull together with the canon law and several books of his opponents. The diet of Worms in 1521, where he made his memorable defence, added to the excommunication of the pope the ban of the emperor. But the dissatisfaction with the various abuses of Rome and the desire for the free preaching of the gospel were so extensive, that the reformation both in its negative and positive features spread in spite of these decrees, and gained a foothold before 1530 in the greater part of northern Germany, especially in Saxony, Brandenburg, Hesse, Pomerania, Mecklenburg, Lüneburg, Friesland, and in nearly all the free cities, as Hamburg, Lübeck, Bremen, Magdeburg, Frankfort, and Nuremberg; while in Austria, Bavaria, and along the Rhine it was persecuted and suppressed. Among the principal causes of this rapid progress were the writings of the reformers, Luther's German version of the Scriptures, and the evangelical hymns, which introduced the new ideas into public worship. The diet of Spire in 1526 left each state to its own discretion concerning the question of reform until a general council should settle it for all, and thus sanctioned the principle of territorial independence in matters of religion which prevails in Germany to this day, each sovereignty having its own separate ecclesiastical establishment and organization in close union with the state. But the next diet of Spire, which convened in 1529, prohibited the further progress of the reformation. Against this decree of the Catholic majority the evan-

gelical princes entered, on the ground of the Word of God, the inalienable rights of conscience, and the decree of the previous diet of Spire, the celebrated protest, dated April 20, 1529, which gave rise to the name of Protestants. The diet of Augsburg in 1530, where the Lutherans offered their principal confession of faith, drawn up by Melancthon and named after that city, threatened the Protestants with violent measures if they did not return shortly to the bosom of the old church. Here closes the first and most eventful period of the German reformation. The second period embraces the formation of the Protestant league of Smalcald for the armed defence of Lutheranism, the various theological conferences of the two parties for an adjustment of the controversy, the death of Luther, the imperial interims or compromises (the Ratisbon, Augsburg, and Leipsic interims), and the Smalcaldian war, and ends with the success of the Protestant army under Maurice of Saxony and the peace of Augsburg in 1555, which secured to the Lutherans states the free exercise of their religion, but with a restriction on its further progress. The third period, from 1555 to 1580, is remarkable for the violent internal controversies of the Lutheran church: the Osiandrian controversy, concerning justification and sanctification; the adiaphoristic, arising originally from the fruitless compromises or interims; the synergistic, concerning faith and good works; and the crypto-Calvinistic or sacramentarian controversy about the real presence. These theological disputes led on the one hand to the full development of the doctrinal system of Lutheranism as laid down in the "Book of Concord" (first published in 1580), which embraces all the symbolical books of that church, namely, the three oecumenical creeds, the Augsburg confession and its "Apology" by Melancthon, the two catechisms of Luther and the Smalcald articles drawn up by the same in 1537, and the "Form of Concord," composed by 6 Lutheran divines in 1577. But on the other hand, the fanatical intolerance of the strict Lutheran party against the Calvinists and the moderate Lutherans, called after their leader Melancthonians or Philippists, drove a large number of the latter over to the Reformed church, especially in the Palatinate (1560), in Bremen (1561), Nassau (1582), Anhalt (1596), Hesse-Cassel (1605), and Brandenburg (1614). The German Reformed communion adopted the Heidelberg catechism, drawn up by two moderate Calvinistic divines, Zacharias Ursinus and Caspar Olevianus, in 1563, by order of the elector Frederic III. or the Pious, as their confession of faith. The 16th century closes the theological history of the German reformation; but its political history was not brought to a final termination until after the terrible 30 years' war by the treaty of Westphalia in 1648, which secured to the Lutherans and the German Reformed churches (but to no others) equal rights with the Roman Catholics within the limits of

the German empire. These two denominations, either in their separate existence or united in one organization (as in Prussia and other states since 1817), are to this day almost the only forms of Protestantism recognized and supported by the government, all others being small self-supporting sects regarded with little sympathy by the popular mind. But within those ecclesiastical establishments Germany has bred and tolerated during the last 50 years almost every imaginable form of theoretic belief, from the strictest old school orthodoxy to the loosest rationalism and scepticism. Since the third jubilee of the reformation, however (1817), there has been a gradual and steady return from neology to the original evangelical Protestantism. II. THE REFORMATION IN SWITZERLAND. This was contemporaneous with, but independent of, the German reformation, and resulted in the formation of the Reformed communion as distinct from the Lutheran. In all the essential principles and doctrines, except that on the mode of Christ's presence in the eucharist, the Helvetic reformation agreed with the German; but it departed further from the received traditions in matters of government, discipline, and worship, and aimed at a more radical moral and practical reformation of the people. It naturally divides itself into three periods: the Zwinglian, from 1516 to 1531; the Calvinistic, to the death of Calvin in 1564; and the period of Bullinger and Beza, to the close of the 16th century. The first belongs mainly to the German, the second to the French cantons, the third to both jointly. Zwingli commenced his reformatory preaching against various abuses at Einsiedeln in 1516, and then with more energy and effect at Zürich in 1519. His object was to "preach Christ from the fountain," and to "insert the pure Christ into the heart." At first he had the consent of the bishop of Constance, who assisted him in putting down the sale of indulgences in Switzerland, and he stood even in high credit with the papal nuncio. But a rupture occurred in 1522, when Zwingli attacked the fasts as a human invention, and many of his hearers ceased to observe them. The magistrate of Zürich arranged a public disputation in Jan. and another in Oct. 1523, to settle the whole controversy. On both occasions Zwingli, backed by the authorities and the great majority of the people, triumphed over his papal opponents. In 1526 the churches of the city and the neighboring villages were cleared of images and shrines, and a simple, almost puritanic mode of worship took henceforward the place of the Roman Catholic mass. The Swiss diet took a hostile attitude to the Reformed movement, similar to that of the German diet, with a respectable minority in its favor. To settle the controversy for the republic, a general theological conference was arranged and held at Baden, Aargau, in May, 1526, with Dr. Eck, the famous antagonist of Luther, as the champion of the Roman, and Ecolampadius of the Reformed

cause. Its result was in form adverse, but in fact favorable to the cause of the reformation. It was now introduced in the majority of the cantons, at the wish of the magistrates and the people, by Ecolampadius in Basel and Haller in Bern, also in part in St. Gall, Schaffhausen, Glarus, Appenzell, Thurgau, and the Grisons; while in the French portions of Switzerland William Farel and Viret prepared the way for Calvin. The small cantons however around the lake of Lucerne, Uri, Schwytz, Unterwalden, Lucerne, and Zug, steadfastly opposed every innovation. At last it came to an open war between the Reformed and Catholic cantons. Zwingli's policy was overruled by the apparently more humane, but in fact more cruel and disastrous policy of Bern, to force the poor mountaineers into measures by starvation. The Catholics, resolved to maintain their rights, attacked and routed the small army of Zürichers in the battle of Cappel, Oct. 1531. Zwingli, who had accompanied his flock as chaplain and patriot, met a heroic death on the field of battle, and Ecolampadius of Basel followed him in a few weeks. Thus the progress of the reformation was suddenly arrested in the German portions of Switzerland, and one third of it remains Catholic to this day. But it took a new start in the western or French cantons, and rose there to a higher position than ever. Soon after this critical juncture the great master mind of the Reformed church, who was to carry forward, to modify, and to complete the work of Zwingli, and to rival Luther in influence, began to attract the attention of the public. John Calvin, a Frenchman by birth and education, but exiled from his native land for his faith, found providentially a new home in 1536 in the little republic of Geneva, where Farel had prepared the way. Here he developed his extraordinary talents and energy, as the greatest divine and disciplinarian of the reformation, and made Geneva the model church for the Reformed communion, and a hospitable asylum for persecuted Protestants of every nation. His theological writings, especially the "Institutes" and "Commentaries," exerted a formative influence on all Reformed churches and confessions of faith; while his legislative genius developed the presbyterian form of government, which rests on the principle of ministerial equality and of a popular representation of the congregation by lay elders, aiding the pastors in maintaining discipline and promoting the spiritual prosperity of the people. Calvin died after a most active and devoted life in 1564, and left in Theodore Beza (died 1605) an able and worthy successor, who together with Bullinger, the faithful successor of Zwingli in Zürich, and author of the second Helvetic confession (1566), labored to the close of the 16th century for the consolidation of the Swiss reformation and the spread of its principles in France, Holland, Germany, England, and Scotland. III. THE REFORMATION IN FRANCE. While the reformation in Ger-

many and Switzerland carried with it the majority of the population, it met in France with the united opposition of the court, the hierarchy, and the popular sentiment, and had to work its way through severe trial and persecution. The tradition in that country was favorable to a change, as France had always maintained a certain degree of independence of Rome, and as the university of Paris, once the centre of European intelligence and culture, had strongly urged a thorough reformation *in capite et membris* on the councils of the 15th century. The first professed Protestants in France were Lefèvre, Wolmar, Farel, Viret, Marot, Olivetan, Calvin, and Beza, all men of distinguished learning and ability; but most of them had to seek safety in exile. It was only after the successful establishment of the reformation in French Switzerland, that the movement became serious in the neighboring kingdom. Calvin and Beza may be called the fathers of the French Reformed church. Their pupils returned as missionaries to their native land. The first Protestant congregation was formed at Paris in 1555, and the first synod held in the same city in 1559. In 1561 the theological conference at Poissy took place, where Theodore Beza eloquently but vainly pleaded the cause of the Protestants before the dignitaries of the Roman church, and where the name Reformed originated. In 1571 the general synod at La Rochelle adopted the Gallican confession and a system of government and discipline essentially Calvinistic, yet modified by the peculiar circumstances of a church not in union with the state, as in Geneva, but in antagonism with it. The movement now unavoidably assumed a political character, and led to a series of civil wars which distracted France till the close of the 16th century. The Roman Catholic party, backed by the majority of the population, was headed by the dukes of Guise, who derived their descent from Charlemagne and looked to the throne, then occupied by the house of Valois. The Protestant party, numerically weaker, but containing some of the noblest blood and best talent of France, was headed by the princes of Navarre, the next heirs to the throne and descendants of Hugh Capet. The queen regent Catharine, during the minority of her sons, Francis II. and Charles IX., of the house of Valois, although decidedly Roman Catholic in sentiment, tried to keep the rival parties in check in order to rule over both. But the Roman league took possession of Paris, while the prince of Condé occupied Orleans. Three civil wars followed in rapid succession, when the court and the duke of Guise resorted to treason, and concerted a wholesale slaughter of the Huguenots in the memorable St. Bartholomew's night, Aug. 24, 1572, the leaders of the party having been expressly invited to Paris to attend the marriage of Prince Henry of Navarre with a sister of Charles IX. as a general feast of reconciliation. (See **BARTHOLOMEW MASSACRE**.) But the party was only diminished in number, by no

means annihilated. Six other civil wars followed with varying fortune, and terminated at last in the victory of Prince Henry of Navarre, who, after the assassination of Henry III. by a Dominican monk, ascended the throne of France as Henry IV. in 1589. This seemed to decide the triumph of Protestantism in France. But the Roman party, still more numerous and powerful, and supported by Spain and the pope, elected a rival king and threatened to plunge the country into new bloodshed. Then Henry, from political and patriotic motives, but apparently not from religious conviction, abjured the Protestant faith, in which he had been brought up, and professed the Roman Catholic religion (1593), saying that Paris and the peace of France were "worth a mass." At the same time, however, he secured to his former associates, then numbering about 760 congregations throughout the kingdom, in spite of the remonstrance of the pope and the bishops, a legal existence and the right of the free exercise of religion, by the celebrated edict of Nantes in 1598, which closes the stormy period of the French reformation. From that time the Reformed church in France flourished, until the revocation of the edict of Nantes by Louis XIV. in 1685 reduced it to a "church of the desert;" yet it survived the most cruel persecutions at home, and enriched by thousands of exiles the population of every Protestant country in Europe and America. IV. **THE REFORMATION IN THE NETHERLANDS** was kindled partly by Lutheran influences from Germany, but mostly by Reformed and Calvinistic influences from Switzerland and France. Its first martyrs, Esch and Voes, were burned at Antwerp in 1523. The despotic arm of Charles V. (who inherited the sovereignty of the 17 provinces from his grandmother) and his son Philip II. of Spain resorted to the severest measures for crushing the rising spirit of religious and political liberty. The duke of Alba surpassed the persecuting heathen emperors of Rome in cruelty, and, according to Grotius, destroyed the lives of 100,000 Dutch Protestants during the 6 years of his regency (1567-'73). Finally, after long and patient endurance, the 7 northern provinces, Holland, Zealand, Utrecht, Gelderland, Overijssel, Groningen, and Friesland, rose in open revolt against the intolerable yoke of foreign tyranny, formed a federal republic, first under the leadership of William of Nassau, prince of Orange, the Dutch Washington, and after his assassination (1584) under his son Maurice, and after a long and heroic struggle accomplished their independence of the church of Rome and the crown of Spain. Their independence was at last acknowledged by Spain in 1609. The southern provinces, however, remained Roman Catholic and subject to Spain. The first Dutch Reformed synod was held at Dort in 1574, and in the next year the university of Leyden was founded. The Protestantism of Holland is predominantly Calvinistic, and adopts as its doctrinal and disciplinary

standards the Heidelberg catechism of 1563, the Belgic confession of 1562, and the articles of the synod of Dort. This important synod was held (1619) in consequence of the Arminian controversy, which violently agitated the country at that time. The Arminians or Remonstrants, differing in 5 points from the Calvinists, and holding to the freedom of the will and a conditional predestination, were condemned by the synod of Dort, but continued as a tolerated sect, and exerted, through the writings of their distinguished scholars and divines, Arminius, Hugo Grotius, Episcopius, Limborch, and Le Clerc (Clericus), considerable influence upon Protestant theology in England, France, and Germany during the 18th century. The orthodox church of Holland has been represented in the United States since 1609 by the Reformed Protestant Dutch church, the second oldest of the denominations in the United States. V. **THE REFORMATION IN HUNGARY.** This country was first brought into contact with the reform movement by disciples of Luther and Melancthon, who had studied at Wittenberg, after 1524. Ferdinand I. granted to some magnates and cities liberty of worship, and Maximilian II. (1564-'76) increased it. The synod of Erdöd in 1545 organized the Lutheran, and the synod of Csenger in 1557 the Reformed church. The German settlers mostly adopted the Augsburg confession, the national Magyars the Helvetic confession. Rudolph II. having in 1576 suppressed religious liberty, Prince Stephen Bocskai, strengthened by his alliance with the Turks, reconquered by force of arms (1606) full toleration for the Lutherans and Calvinists in Hungary and Transylvania. In the latter country Socinianism also found a refuge and has maintained itself to this day. VI. **THE REFORMATION IN POLAND** was prepared by fugitive Bohemian Brethren or Hussites, and promoted by the writings of the German reformers. King Sigismund Augustus (1548-'72) favored the movement and corresponded with Calvin. The most distinguished Protestant of that country was Jan Laski, or John à Lasco, a Calvinist, who fled from Poland for his faith, was called back by the Protestant nobility, aided by several friends translated the Bible, and labored for the union of the Reformed and Lutherans (died 1560). A compromise between the two parties was effected by the general synod of Sandomir (*Consensus Sandomiriensis*) in 1570. But subsequently internal dissensions, the increase of Socinianism, and the efforts of the Jesuits greatly interfered with the prosperity of Protestantism in that country. The German provinces now belonging to Russia, Courland, Livonia, and Esthonia, opened likewise the door to the reformation, and adopted the Augsburg confession. VII. **THE REFORMATION IN SCANDINAVIA.** The reformers of Sweden were two brothers, Olaf and Lars Peterson, or Petri, disciples of Luther, who after 1519 preached against the existing state of the church. Gustavus Vasa, who delivered the country from the

Danes and became king in 1523, favored Protestantism from political and mercenary motives; the whole country, including the bishops, followed without much difficulty. He appropriated a large portion of the wealth of the church to meet the expenses of his wars and administration. The synod of Oerebro in 1529 sanctioned the reform, and the synod of Upsal in 1593, after a fruitless attempt to reconcile the country to Rome, confirmed and completed it. Sweden adopted the Lutheran creed, to the intolerant exclusion of every other, and retained the episcopal form of government in the closest union with the state. Sweden did great service to the cause of Protestantism in Europe, by its gallant king Gustavus Adolphus, during the 30 years' war. More recently attempts have been made, though without success as yet, to abolish the intolerant laws against dissenters. Denmark became likewise an exclusively Lutheran country, with an episcopal form of state-church government, under Christian III. A diet at Copenhagen in 1536 destroyed the political power of the Roman clergy, and divided most of the church's property between the crown and the nobility. The remaining third was devoted to the new ecclesiastical organization. Bugenhagen of Wittenberg was then called to complete the reform. From Denmark the reformation passed over to Norway about 1537. The archbishop of Drontheim fled with the treasures of the church to Holland; another bishop resigned; a third was imprisoned; and the lower clergy were left the choice between exile and submission to the new order of things, which most of them preferred. Iceland, then subject to Danish rule, likewise submitted to the Danish reform. VIII. **THE REFORMATION IN ENGLAND.** The struggle between the old and the new religion lasted longer and raged more fearfully in England and Scotland than on the continent, and continued in successive shocks even down to the end of the 17th century, for Puritanism was a second reformation; but it left in the end a very strong impression upon the character of the nation, and affected deeply its political and social institutions. In theology English Protestantism was dependent upon the continental reform, especially the ideas and principles of Calvin; but it displayed greater practical energy and power of organization. It was from the start a political as well as a religious movement, and hence it afforded a wider scope to the corrupting influence of selfish ambition and violent passion than the reformation in Germany and Switzerland; but it passed also through severer trials and persecutions. In the English reformation we distinguish five periods. The first period (1527 to 1547) witnessed the abolition of the authority of the Roman papacy under Henry VIII. This was merely a negative and destructive process, which removed the outward obstruction and prepared the way for the reform. Henry VIII. quarrelled with the pope, not on religious or theo-

logical, but purely personal and selfish grounds, because the pope properly refused his consent to his divorce from Catharine of Aragon and his marriage to Anne Boleyn. "The defender of the faith"—a title given him by the pope for the defence of the 7 sacraments against Luther—remained in doctrine and religious sentiment a Roman Catholic to the end of his life; and at his death the so called "bloody articles," which enjoined under the severest penalties the dogma of transubstantiation, auricular confession, private masses, and the celibacy of the priesthood, were yet in full force. The only point of radical difference was the royal supremacy. He simply substituted a domestic for the foreign, and a political for an ecclesiastical papacy, and punished with equal severity Protestant as well as Roman Catholic dissenters, who dared to doubt his supreme headship of the church of England. But while he thus destroyed the power of the pope and of monasticism in England, a far deeper and more important movement went on among the people under the influence of the revived traditions of Wycliffe and the Lollards, the writings of the continental reformers, and the English version of the Scriptures commenced by Tyndale, carried on by Coverdale and Rogers, and revised by Cranmer. The second period embraces the reign of Edward VI., from 1547 to 1553, and contains the positive introduction of the reformation by the coöperation mainly of the duke of Somerset, protector and regent during the king's minority, and Cranmer, archbishop of Canterbury, who by his pliable conduct and subserviency to the will of Henry had preserved the idea and hope of a reformation through that reign of terror. Cranmer was assisted in the work by Ridley and Latimer, and by several Reformed divines from the continent whom he called to England, especially Martin Bucer of Strasbourg, now elected professor at Cambridge, and Peter Martyr of Zürich (originally from Italy), for some time professor at Oxford. Calvin's advice was solicited by Somerset. The most important works of this period, and in fact of the whole English reformation next to the English version of the Bible, are the 42 articles of religion (subsequently reduced to 39), or a new and moderately Calvinistic confession of faith, and the "Book of Common Prayer," or a new directory of worship in the vernacular tongue, on the basis of the ancient Latin service, but with essential changes. These two standards of public doctrine and public worship have retained a remarkable hold upon the English nation to this day. The third period is the reign of Queen Mary, from 1553 to 1558, and presents to us the unsuccessful attempt of that queen and her friend, Cardinal Pole, now made archbishop of Canterbury after the deposition of Cranmer, to undo the reformation and to restore the Roman Catholic religion and the authority of the pope. This Catholic interim did more to consolidate the reforma-

tion in England than Henry, Edward, and Elizabeth. Hundreds of martyrs fertilized the Protestant soil in this short reign, among them the three British reformers, Cranmer, Ridley, and Latimer, who were publicly burned at Oxford in 1556. Many others fled to the continent, especially to Geneva, Zürich, Basel, and Frankfort-on-the-Main, where they were hospitably received and brought into closer contact with the Reformed churches of Switzerland and Germany. The fourth period is the restoration and permanent establishment of the Anglican reformation during the long reign of Elizabeth, 1558 to 1603. The Roman Catholic hierarchy was replaced by a Protestant, and the articles of religion and the common prayer book of the reign of Edward were introduced again after having been submitted to a revision. The ecclesiastical supremacy of the crown was likewise renewed, but under a modified form, the queen refusing the title "supreme head" of the church of England, and choosing in its place the less objectionable title "supreme governor." The convocation and parliament readily sanctioned all these changes; but the Anglican church as established by Elizabeth was semi-Catholic in its form of prelatical government and liturgical worship, a sort of *via media* between Rome and Geneva. It suited the policy of the court and the taste of the majority of the English people, but was offensive to the severer school of strict Calvinists who had returned from their continental exile. Hence the agitation in the bosom of the reformed church of England, and the growing conflict between the Episcopalian majority and the Puritanic minority. Elizabeth's reign was equally intolerant against Puritan as against papal dissenters, and passed the severest penal laws against both. But while the Catholic party was almost annihilated in England, the Puritan party grew more powerful under the successors of Elizabeth, and succeeded in overthrowing the dynasty of the Stuarts, and even the Episcopalian establishment, although the latter revived from the shock. These troubles and agitations constitute the fifth period in the history of English Protestantism, which in some respects is the most important and interesting, but lies beyond the age of the reformation proper. IX. THE REFORMATION IN SCOTLAND. The first impulse to the reformation in Scotland proceeded from Germany and Switzerland. Copies of the writings of the continental reformers and of Tyndale's English Testament found their way to the far north. The first preacher and martyr of Protestantism in that country was Patrick Hamilton, a youth of royal blood, and for some time a student at Wittenberg and Marburg, who was condemned to death by Archbishop Beaton and burned at the stake. His dying words were: "How long, O Lord, shall darkness cover this realm? How long wilt thou suffer this tyranny of men? Lord Jesus, receive my spirit." The movement gradually increased in spite of persecution, es-



pecially after the rupture of England with the pope, and was carried to a successful conclusion under the guidance of John Knox, the Luther of Scotland. He was a disciple and admirer of John Calvin, with whom he spent several years during the reign of the Catholic Mary. He returned after the accession of Elizabeth to his native country, resolved to reform the Scotch church after the model of the church of Geneva, which he pronounced to be "the most perfect school of Christ since the days of the apostles." After a short civil war the parliament of 1560 introduced the reformation, and adopted a Calvinistic confession of faith, drawn up by Knox, Spottswood, Row, and others (superseded afterward by the Westminster standards), and prohibited under severe penalties the exercise of the Roman Catholic worship. In 1561 the first "Book of Discipline" was issued, and gave the new church a complete presbyterian organization, culminating in a general assembly of ministers and elders. The mode of worship was reduced to the greatest simplicity, with a decided preëminence of the didactic element. These reforms, however, were all introduced without the royal sanction and during the vacancy of the throne. When therefore the unfortunate Mary Stuart, of French education, tastes, and manners, and in no sympathy whatever with the public opinion then ruling in Scotland, ascended the throne in Aug. 1561, she made an attempt to restore the Roman Catholic religion, to which she was sincerely devoted. But her own imprudences and the determined resistance of the nation frustrated her plans, and after her flight to England (1568), Protestantism was again declared the only religion of Scotland, and received formal legal sanction under the regency of Murray, Queen Mary's half brother, during the minority of James VI., afterward James I. of England.

**REFORMED CHURCH.** The Protestants on the continent of Europe were divided, about the middle of the 16th century, into two main bodies, known as the Lutheran church and the Reformed church. Though these designations are insufficient to include all the subsequent divisions and sects, yet they mark two distinct types of theology and polity, which have been ever since perpetuated. The so called Reformed churches are those nurtured under the influence of what is popularly known as the Calvinistic system. This system is contrasted with Lutheranism in several marked particulars. Its key-note is in the doctrine of the divine sovereignty, held not as a philosophical speculation, but as a religious tenet. Luther, indeed, agreed with Calvin, using even stronger forms of statement, as to the servitude of the fallen human will, and the doctrine of election. But the Lutheran theology, under Melancthon's influence, and in the *Formula Concordiæ*, renounced the decree of unconditional election; nor did its divines defend the supralapsarian scheme. Another theological difference was upon the theory of

the Lord's supper. Luther advocated a literal interpretation of the words: "This is my body," holding to the real presence of Christ in the eucharist, in such a sense that the communicant, worthy or unworthy, actually receives the body of Christ into the mouth, "in, with, and under the form of the bread;" though denying transubstantiation, he affirmed a supernatural union of the body and blood of Christ with the consecrated elements. In further vindication of this scheme, the Lutheran divines asserted the ubiquity of Christ's body, defending this thesis by the theory that in the union of the divine and human natures in the person of Christ, the properties of the one nature were communicated to the other (the *communicatio idiomatum*), running out into the metaphysical postulate: *Finitum capax infiniti*. Calvin, on the contrary, maintained the real presence of Christ in the supper only in a spiritual sense, and a spiritual reception on the part of the communicant, the body of Christ meanwhile remaining in heaven, and imparting its virtue by a wonderful spiritual process. (See Julius Müller, *Lutheri et Calvini Sententiæ de Sacra Cæna inter se comparatæ*, Halle, 1858.) In contrast with Zwingli, however, Calvin held that the sacraments were seals and pledges, and not merely signs, of divine grace. But the differences on these two points are but indices of wider underlying tendencies, represented respectively by the Lutheran and Reformed communions. Montesquieu says that each believes itself to be most perfect: "The Calvinists believe themselves to be most conformed to what Jesus has said, the Lutherans to what the apostles have done." "The Calvinists," says Schweizer, "contended against the paganism of Rome, and the Lutherans against its Judaism." The latter have been more practical, the former more speculative; the one most absorbed in the reconciliation of sovereignty with free will, the other most devoted to the problem of the relation of the divine to the human, especially in the person of Christ. The Lutheran paid more deference to tradition, the Calvinist relied more on the exclusive authority of Scripture, often not distinguishing between the Old and New Testaments. Both adopted the presbyterian polity; but the Lutherans insisted more on the territorial rights of princes, while the Reformed emphasized the rights of the people. The one has been called the church of the theologians, the other the church of the people. Baur (*Dogmengeschichte*) says: "Calvinism is the real Protestant antagonism to Catholicism, and that, too, in the doctrine which was at first the common property of all the reformers, but which was systematically unfolded only in Calvinism. That dependence of the individual upon a power absolutely determining his will and acts, which Catholicism presents in its doctrine of the church, is by Calvinism connected with the absolute decree. As there the church, so here the decree, is the seat of all salvation." In the respective historical



position and influence of the Lutherans and Reformed, there is also a marked diversity; the Lutherans have been stationary, the Reformed progressive; the former were planted in the heart and the north of Europe, the latter among the maritime and freer nations; the one, after the decline of Melancthon's influence, had for a long time only a single type of doctrine, while the Reformed theology was prolific in systems of varied type, and in a rich symbolical literature. A full outline of the history of the Reformed church would demand an account of its geographical diffusion, of its different types of theology, of the various denominations which have been nurtured under its influence, and of its peculiar practical energy as seen in its polity and reformatory spirit. Our limits allow only a few condensed statements under each of these heads.—The Reformed movement began in Switzerland, under the lead of Zwingli, the hero of Zürich, as early as 1516; in Basel it was marshalled by *Ecclampadius* and Bullinger; Geneva was aroused by the intrepid Farel, and taught and organized by Calvin, who came thither, a refugee from France, in 1536. The whole of Switzerland was revolutionized by a grand popular movement. The same form of faith was planted in the Palatinate, where was formed the German Reformed church, under the elector Frederic III., combining the spirit of Melancthon with that of Calvin. It was accepted in Bremen, 1561-'81; in Nassau, 1586; in Anhalt, 1596; in Hesse-Cassel, 1605; and even the elector of Brandenburg, John Sigismund, adopted it in 1614. Its churches were also scattered in Bohemia and Poland. The first reforms in Spain and Italy, soon suppressed, were nourished in part under its teachings. In France it attained such vigor that in 1559 a general synod was formed at Paris, and its churches numbered some 2,000. But here they were decimated by religious wars, and by the massacre of St. Bartholomew's, 1572, and enfeebled by the abjuration of Protestantism by Henry of Navarre. The revocation of the edict of Nantes, Oct. 18, 1685, deprived 2,000,000 of their religious security, and drove out half a million into all parts of Europe and America before the close of the century. The Reformed system was also planted in Holland, Voes and Esch being there the first martyrs of the reformation, in 1528. The fierce struggle of the United Netherlands with Philip II. of Spain (1555-'98) was both for civil and religious freedom, under the great leadership of William, prince of Orange. The peace of Westphalia in 1648 confirmed the rights and liberties of the Dutch church. In England, the reformation at first advanced more slowly. Cranmer gave it shape, mainly in the sense of the Reformed symbols, under Edward VI. The persecutions under Mary (1553-'8) sent the most ardent of England's reformers to Zürich and Geneva, whence they brought back the seeds of Puritanism. But the Anglican church, though allied to the Reformed faith in its articles of

religion, retained the episcopate, and in its prayer book taught the elements of the sacramental system. The act of uniformity (1559) led to a strong Puritan resistance; and the conflict passed over into the 17th century, coming to its height in the civil war of 1643-'9, and the beheading of Laud and of King Charles. But the success under Cromwell was of short duration; and the strength of the Reformed influence was transplanted from England to America. In Scotland it was firmly established under Knox's influence after his return from Frankfort in 1559, and organized by the "Solomon League and Covenant;" and this land has never since swerved from its loyalty to the faith of Geneva. In the form of Congregationalism, the same system of faith was transplanted to the new world by the pilgrims who landed on Plymouth rock, and by large subsequent immigrations; in the form of Presbyterianism (including the German and Dutch-Reformed churches) it was planted in the middle and southern colonies by emigrants from Scotland, Ireland, England, and Holland; and at no period since has it ceased to exert a strong and vital influence upon the principles and history of this country. The Baptist churches of England and America adopt in the main the same system of faith. In other parts of the world, by colonization and emigration, the Reformed church is also widely diffused. In the freest and most advancing nations it has had its strongest hold and influence—in those countries that are leading the van in the general progress of mankind.—In correspondence and harmony with this wide geographical diffusion, the Reformed church has also shown great productive power in respect to confessions of faith and systems of theology, which, while retaining the same essential features, have set forth different types of doctrine. In this respect it is distinguished from the Roman Catholic and the (orthodox) Lutheran communions. At the very beginning of the Reformed movement, we find Zwingli and Calvin differing in their modes of expounding the common faith—the former resolving original sin into a natural defect, and cultivating theology more in the spirit of the man of letters. Even in Switzerland, beside the stricter traditional and scholastic method, exemplified by Heidegger, and brought to its consummation in Turretine, Stapfer also taught, in his able "Polemics," the mediate and not the exclusively immediate imputation of Adam's sin. The famous school of Saumur in France, under the impulse of the Scotchman Cameron and the guidance of Amyraut, abandoned the dogma of a limited atonement in favor of the scheme of a hypothetical universalism of divine grace. But the most fruitful seminary of these Calvinistic systems in the 17th century was Holland. Its divines were at first divided between the supralapsarian and the infralapsarian schemes. The great Arminian controversy led to the convocation of the

synod of Dort, 1618-'19, at which representatives attended from the English church as well as from other reformed communions; and where, against the Remonstrants, the five points of Calvinism were articulately defined, viz.: 1, unconditional election; 2, particular redemption; 3, total depravity; 4, grace irresistible; 5, the perseverance of the saints. Three prominent types of theology were represented in the subsequent religious development in the Netherlands: 1, the scholastic, advocated by Maresius, Wendelin, Gomarus, and Voetius; 2, the federal theology, or the theology which takes the idea of covenants as its central conception, which received its fullest exposition in the works of Cocceius and Witsius, modifying the rigidity of the scholastic formulas by a more biblical and historical method; and 3, the Cartesian type, which made use of the principles of the philosophy of Descartes to expound and vindicate the Christian system, and rendered good service in giving a more systematic form to natural theology, as the logical basis of revealed theology, and in the attempt to harmonize the rights of reason with the demands of faith. The Reformed theology of the Palatinate found its best expression in the Heidelberg catechism, drawn up by Ursinus and Olevianus in 1563, and adopted as a symbol by the German Reformed and Dutch churches. The same system of faith in England, Scotland, and America received its most articulate exposition in the Westminster confession of faith and catechisms, the ripest product of the confessional literature of the 17th century, adopted by the long parliament in 1646, by the kirk of Scotland in 1647, by the Cambridge synod of New England in 1648, and by the Presbyterian church of America in 1729. The subsequent divisions in the Scotch church were chiefly upon the question of the relation of the church to the civil power (Associate presbytery, 1733; Covenanters, 1743; Burghers and Anti-Burghers, 1747; Relief Secession, 1761). In the "marrow controversy" (Fisher's "Marrow of Modern Divinity") five propositions were condemned in 1720, which were supposed to have an Antinomian tendency. The Scottish orthodoxy was upheld in the last half of the 18th century by Erskine, Dick, and Hill; though somewhat enfeebled by the lukewarmness of the Robertson administration, 1758-'82. It has been revived in the present century, chiefly through the zealous advocacy of Chalmers. In the Anglican church there have always remained some able advocates of the fundamental principles of the Reformed system, as Davenant, Leighton, Ezekiel Hopkins, and John Edwards; but it has chiefly flourished among the nonconformists of England, represented by such men as Thomas Watson, Baxter, Owen, Howe, Ridgeley, Matthew Henry, and Isaac Watts, not to name men of later date. In the writings of Tobias Crisp it is Antinomian in its tendency.—Nearly contemporaneous with the decline of the Calvin-

istic system in its productive vigor upon the continent of Europe, was the rise of its most elaborate and philosophical defender in our own land, in the person of the elder Edwards. (See EDWARDS, JONATHAN.) He stands at the head of a school, that of the so called New England theology, which may well vie with any European type of this system in ingenuity, comprehensiveness, and moral vigor. Denying a limited atonement, insisting upon the distinction between natural ability and moral inability, making the essence of virtue to consist in holy love, and opposing the dogma of immediate imputation, it has exerted a prevailing influence upon the tone of theological speculation, and borne permanent fruits in the writings of Bellamy, Hopkins, Smalley, the younger Edwards, and Emmons. The later representatives of the Reformed dogmatics upon the continent of Europe, as Schleiermacher, Ebrard, Schneckerburger, Schweizer, and Vinet, have advocated it in a historical and philosophical, rather than a traditional and scholastic spirit.—In estimating the influence of this system, we ought not to pass unnoticed the fact that a large proportion of the denominations and sects of modern Christendom have sprung into being from its impulse, or in opposition to it. This was the case with the Arminians; in part also with the Unitarians of Poland, England, and New England; with the Baptists in their various ramifications; and with the Wesleysans or Methodists of England and America. The Reformed church has been fruitful in sects. The practical and reformatory vigor of this system is doubtless to be ascribed in a good degree to its polity, in conjunction with its spirit. The Lutheran church of Europe has always been under bonds to the state to keep the peace; the Reformed churches have more frequently claimed their own rights, and demanded a relative independence. The presbyterian polity was essentially a representative system; its lay elders (chosen for life in Scotland and Geneva, and for a limited period in Holland, France, and Germany) gave it vitality. Its presbyterial and synodal constitution—aristocratic in France and Geneva, and more democratic in Holland and Scotland—has made it efficient. It has also been zealous in administering discipline. The power of the laity was still further enhanced in the congregational or independent form of polity, so largely adopted in England by the nonconformists, including the Baptists, and prevalent in New England. Thus fitted to be a working church, it has in most of its branches been zealous in domestic and foreign missions, and has not seldom led the way to the progressive reforms that characterize modern society. And with all the strictness of its theological system, it has almost uniformly been inclined to cooperate in philanthropic and religious movements with those of other shades of belief.

REFORMED PROTESTANT DUTCH CHURCH, a religious body which arose in the

Netherlands early in the 16th century. It attained its form and organization during the long and celebrated struggle against Philip II. under the leadership of the princes of Orange. For a long time those who embraced the evangelical doctrines could worship only with the utmost privacy, and they denominated their assemblies the churches of the Netherlands under the cross. In 1561 a confession of faith was published by Guido de Bres, called the Belgic confession, modelled after that of the Calvinistic church of France. It was adopted by the first synod held in 1568 at Wesel on the Rhine. Public field preaching was introduced about the same time, and also singing in the native language. Churches were formed after the Genevan presbyterian model, and at the synod of Wesel rules of church order were adopted, and the scattered churches were organized as one combined body. Soon afterward the yoke of Spain was formally thrown off by the provinces, and the Protestant faith became the religion of the state. In the early part of the 17th century the famous Arminian controversy distracted the church. Arminius, professor of theology in the university of Leyden, advanced sentiments which were thought by his colleague Gomarus to be at variance with the standards of the church. A controversy arose, in which ministers and church members throughout the country took sides, the larger portion by far sympathizing with the Gomarists, while those who were high in political power for the most part favored the Arminians. In a remonstrance to the states, the views of the Arminians on the famous five points of predestination, redemption, depravity, conversion, and perseverance were defined. From this paper they were called Remonstrants, and their opponents were from their reply called Contra-Remonstrants. The Contra-Remonstrants urged the call of a national synod to decide on the new opinions, and the Remonstrants opposed it. The former contended for the independence of the church in matters of discipline; the latter deferred much to the authority of the civil government. At length, after a protracted controversy under the stadtholder Maurice, a national synod met at Dort in 1618, and continued in session 6 months. By it the doctrines of the Remonstrants were condemned, and those who had taught them were deposed from the ministry and deprived of all ecclesiastical and academical offices. The decision of the synod was followed by the action of the states forbidding all assemblies of the Remonstrants, and banishing many of the deposed ministers. The Remonstrants were afterward tolerated, and have continued as a small sect in the Netherlands, while their doctrines have spread widely into other countries. By this last national synod of the church in the Netherlands her doctrines and order were finally settled. Through the remainder of the century she was greatly prospered, was zealously carried into all the Dutch colonies east and west, and was known especially for her toler-

ant spirit. The church and republic of the Netherlands furnished an asylum for the oppressed of every creed and nation. At the present time the ministers and members of the national church have to a great extent departed from the evangelical doctrines of the standards, and rationalistic and Socinian ideas greatly prevail among them. Yet there are many eminent men, civilians as well as ministers, who are speaking boldly for evangelical views. A few years ago some ministers, on account of the obstacles presented by the civil authorities to evangelical preaching, and after having been fined and imprisoned, seceded from the church. They have established a theological seminary, and have gathered a number of congregations. —The church was introduced into America early in the 17th century. The first permanent agricultural settlement in New Netherlands was made in 1623, and soon the colonists enjoyed the services of two *krankbesoekers* or consolers of the sick, who were officers of the church, and whose duty it was to visit and pray with the sick, and conduct public worship in the absence of a minister. These read the Scriptures and creeds to the people assembled in an upper room over a horse mill. In 1628 the Rev. Jonas Mjchaelius arrived at Manhattan, organized a consistory, administered the sacraments, and performed all the functions of the ministry. He was succeeded in 1633 by the Rev. Everardus Bogardus, who was accompanied by the first schoolmaster, Adam Roelandsen. Bogardus married the widow Annetje Jansen, whose farm has now become the valuable property held by the corporation of Trinity church. In his time a plain wooden building was put up for worship in Broad street, between Pearl and Bridge. The second building was erected under the administration of Director Kieft in 1642, and stood within the walls of Fort Amsterdam on the Battery. After the surrender of New Amsterdam to the English in 1664, this church was used by the military chaplains when not occupied by the consistory; and when the Dutch people removed into their new edifice in Garden street, it was used by the English garrison for worship down to 1741. Public worship was commenced at Albany perhaps as early as at New Amsterdam, but the first minister there of whom we have knowledge was Johannes Megapolensis, who soon after his arrival in 1643 preached the gospel to the Indians who came to Fort Orange to trade. During the Dutch rule churches were also established at Esopus (Kingston, N. Y.), Flatbush and Flatlands, and Brooklyn. New Amsterdam at the time of its surrender contained only about 1,500 inhabitants, and in the entire province of New Netherlands there were 5 churches and 6 ministers. From that time until recently the progress of the church in America has been necessarily slow for the following reasons: 1. The emigration from the Netherlands almost entirely ceased, and many families willing to live only under their native government re-

turned to the Netherlands. 2. Government patronage was removed on the transfer of the province to the British and the introduction of the English church, to which church also advantages were given amounting to its virtual establishment by law in New York, Westchester, Queens, and Richmond. 3. The Dutch language was used exclusively in worship down to the year 1763; consequently the church could not gather within her fold those who used another language, nor extend herself to new settlements. Meanwhile the English language was used in schools and in public business, and had at last become the prevailing and popular tongue. The church suffered loss by her tardiness to introduce this language into her public services. A demand was made for its introduction into the church at New York, which awakened bitter opposition on the part of the older members. By means of this difficulty, three classes of persons were lost to the church: 1, those who were anxious to enjoy English preaching and could not endure the delay of its introduction; 2, the lovers of peace, who sought it in other communions; 3, those over-zealous adherents of the Dutch party who preferred, if they must hear English, to hear it in the Episcopal church. In 1763 the Rev. Archibald Laidlie was called to preach in the English language, and his first sermon was delivered to an immense audience in the Middle Dutch church, the present post office. Down to the opening of the present century the Dutch continued to be the prevailing language in the various pulpits, but after that it rapidly gave way to the English, and now is no more heard in public worship, save in the churches composed of recent emigrants from Holland. The minutes of the general synod began to be kept in English in 1794. 4. The church suffered from a deficiency of ministers, and the obstacles that were in the way of obtaining a supply. She had no educational institutions, and no church judicatory with power of ordination; her ministers all belonged to the classis of Amsterdam, and to that classis she applied for ministers, and to it sent her candidates to receive ordination. By these means the congregations were often subjected to great delay and expense. Then arose the noted *coetus* and *conferentie* controversy. The *coetus* was a body formed in 1747, which possessed no ecclesiastical, but only advisory powers. From this sprang the *coetus* party, who proposed that this assembly should be changed into a regular classis, that an educational institution should be established, and that the church should thus boldly undertake to supply herself with a ministry. This was opposed by the *conferentie*, who zealously advocated a continuation of the state of dependence on Holland. This controversy was carried on in a bitter spirit and to the banishment of peace from many churches for a number of years. At last, through the agency of the Rev. John H. Livingston, D.D., the breach was healed, and in 1771 an independent church

organization was effected. He was a native of Poughkeepsie, N. Y., and while a student of theology at the university of Utrecht was much occupied in giving the Holland ministers accurate ideas of the wants of the church in America, and in impressing it upon them that her independence was necessary to her continuance. They approved of his plans. On his return to America a convention of ministers and elders met in New York in Oct. 1771. By this convention, the proceedings of which were marked by entire harmony, three objects were secured: 1, the internal arrangement and government of the churches, embracing the organization of superior church judicatories and measures for the establishment of a professorship of theology; 2, healing of dissensions; 3, correspondence with the church in Holland. The acts of the convention were soon followed by the approbation, good wishes, and prayers of the classis of Amsterdam. The church in Holland made it an express condition of the independence of the church in America that she should at once initiate measures for the training of a learned ministry. The classis of Amsterdam was therefore petitioned to send over a professor of theology, but instead of this they recommended the appointment of Dr. Livingston. On account of the breaking out of the revolutionary war, his appointment was delayed until 1784. During the war the congregations in New York were scattered, the houses of worship desecrated, and of the 4 pastors, 3 never returned to their field of labor. The church now completed her organization by the formation of a general synod, which at first met triennially, but since 1812 annually. A constitution, compiled by Drs. Livingston and Romeyn from the acts of the synod of Dort, and adapted to the church in this country, was adopted. In 1770, through efforts of the *coetus* party, a charter had been obtained for a college, to be called Queen's, which was established at New Brunswick, N. J., and whose first president was the Rev. Dr. Jacobus R. Hardenbergh. A chief object of this college was, as its charter declares, to prepare young men for the ministry of the Reformed Dutch church, and it was required that its president should be a member of that church. From fear of awakening old prejudices, the professorship of theology was kept separate from the college until 1810. At that time, in virtue of an arrangement between the general synod and the board of trustees, Dr. Livingston, who had hitherto taught his students in theology while holding his pastoral charge in New York, gave up his charge, removed to New Brunswick, and assumed the office of president of the college, which he held in connection with his professorship until his death in 1825. In 1825 the college, whose exercises had for some years been suspended, was revived under the name of Rutgers, given in honor of Col. Henry Rutgers of New York, and a new covenant was framed between the synod and board of trustees. (See New BRUN-

wick.)—Members of the Dutch church coöperated in 1793 with many from other churches in forming the New York missionary society. Ministers were also sent on missionary tours to Kentucky and Canada, and some churches were established, but by reason of distance and inherent weakness they were soon lost. The efforts of the church at extension were afterward mainly directed to western New York, and about the year 1830, when the present board of domestic missions was organized, a number of important posts were occupied. In 1836 missions to the western states were commenced. At present there are 48 churches in the western states, of which 25 are composed of recent emigrants from Holland. There are no churches in New England, and none south of Philadelphia. Five sixths of the churches are in the states of New York and New Jersey. Two thirds of all the churches in the connection have been organized within the last 40 years, and during that time the ministry has increased more than fourfold in numbers. In 1817 the general synod coöperated with the Associate Reformed and Presbyterian churches in the formation of the united foreign missionary society, which in 1826 was merged in the American board of commissioners for foreign missions. In 1832 the synod made an arrangement with the American board, under which in 1836 a band of missionaries went forth from the Dutch church destined for the Dutch East Indies. Stations were commenced on the island of Borneo, and soon a part of the band was sent to establish a mission at Amoy in China. On account of a diminution of the numbers of the missionaries and a lack of reinforcements, the stations on Borneo were after a few years abandoned. The missionaries at Amoy have been eminently successful. In southern India are several churches forming the classis of Arcot, and ministered to by 5 sons of the late Rev. Dr. John Scudder. The arrangement with the American board continued in force until 1857, when an amicable separation was effected, and the missions of Amoy and Arcot were transferred to the Reformed Dutch church. In 1859 missionaries were sent to Japan. Beside the board of domestic and foreign missions, the general synod has established a board of Sabbath school union; a board of education for the aid of pious indigent young men in preparing for the ministry; a board of publication, which aims to spread a sound religious literature; and a relief fund for the aid of disabled ministers and the families of deceased ones.—In 1822 the Rev. Solomon Froeligh, D.D., of Hackensack and Schralenburg, N. J., and a few other ministers, seceded with their congregations from the Dutch church, on the alleged ground of a prevailing laxness in doctrine and discipline, and organized the "True Reformed Dutch church." It numbers less than 20 congregations.—The doctrinal standards of the church are: 1, the Belgic confession of faith; 2, the Heidelberg catechism; 3, the canons of the synod of

Dort. The Belgic confession of faith, as has been previously stated, was published in 1561, and adopted as a standard by the synod of Wesel in 1568. This was the basis of the organization of the Reformed church in the Netherlands, and in its 37 articles presents a complete systematic view of the doctrines of the reformation. The Heidelberg catechism was received about the same time. It had been composed by order of the elector Frederic III. for the Palatinate, by Ursinus, a professor in the university of Heidelberg, and Olevianus, a court preacher. It was intended by the elector to be a harmonizing symbol of faith, to be received by both the Lutherans and Reformed in his dominions. The church in the Netherlands heartily adopted it, divided it into 52 Lord's days, and ordered that it should not only be taught to the youth, but expounded once in the course of every year from the pulpit. The canons were adopted by the synod of Dort in 1619, and framed with special reference to the 5 points of the Arminians which were condemned by that synod. In the church of the Netherlands, forms of prayer were at first used in ordinary public worship in connection with extemporaneous prayers. Such forms are now found in the liturgy of the Reformed Dutch church in America, but their use, though allowed, is not enjoined. Practically they are regarded as directories for the performance of that part of the service. There are other portions of the liturgy whose use is made obligatory by the constitution, viz., forms for the administration of the sacraments, for the ordination and installation of ministers, elders, and deacons, and for the excommunication and readmission of members. This liturgy in its essential parts was composed for the church in London in 1551 by Jan Laski or à Lasco, who used the labors of Calvin, Polanus, and others. This church in London was composed of Protestant refugees from Germany and the Netherlands, who in Britain under the reign of Edward VI. found an asylum from persecution. Driven back to the continent on the accession of Mary, they carried their liturgy with them. It was rearranged by Dalthenus, and adopted substantially by the first synod of the churches of the Netherlands, which was held at Wesel in 1568. It was afterward revised and confirmed by the synod of Dort. The English translation now in use in this country was first published by the consistory of the collegiate church of New York in 1767. In 1853 a movement was made for the revision and amendment of the liturgy. This subject was under consideration until 1858, when it was decided that no alterations should be made. The prescribed order of public worship is as follows: 1, after a space for private devotion, invocation; 2, salutation; 3, reading the ten commandments or some other portion of Scripture, or both; 4, singing; 5, prayer; 6, singing; 7, sermon; 8, prayer; 9, collection of alms; 10, singing; 11, benediction. In the

other services of the day the reading of the commandments is omitted, and the last service is always to be concluded with the doxology. Formerly, the apostles' creed was recited, and a clerk (*roozlezer*), who was also chorister, conducted the opening services from his desk below the pulpit by reading the commandments and a chapter, and announcing and leading in the singing of a psalm. The minister had an hour glass standing on the pulpit, to measure the time to be occupied by the sermon, which was recommended not to exceed an hour. On some part of every Sabbath a portion of the Heidelberg catechism was expounded. Great care was from the first taken in the instruction of the young. Children were almost universally baptized, and provision was made for their instruction in Christian doctrine by parents, church officers, and schoolmasters. The school was an appendage of the church, taught by a schoolmaster appointed by the consistory, and was constantly visited by the minister and elders. The school came with the church into this country, but the continued connection became in time impracticable. Interest has lately been reawakened in this subject, and parochial schools have been established in a number of congregations. In public worship only such psalms and hymns are sung as have been recommended by the general synod. Singing in the English language was introduced in 1767. In 1813 the Rev. Dr. Livingston, by order of the general synod, compiled the "Book of Psalms and Hymns" now in use, to which, however, large additions of hymns have subsequently been made. The observance of the principal feast days, as Christmas, Easter, Ascension, and Whitsuntide, was denounced by the early synods in the Netherlands; but as it was found that the people would otherwise devote them to their pleasures, it was afterward ordained that public worship should be conducted on them, and they thus be turned to profit. In accordance with this they were for a long time carefully observed by the church in America, nor has respect for them ceased in some of the congregations at this day.—The government of the church is according to the Genevan presbyterian model. The officers are ministers, elders, and deacons, to which may be added professors of theology. The elders have in connection with the ministers the spiritual oversight of the church. They receive, watch over, dismiss, and discipline members. The board of elders corresponds to the session in the Presbyterian church. The deacons collect and administer alms. The minister, elders, and deacons, or the elders and deacons if there be no minister, compose the consistory, to which the government of the individual church belongs. In the great majority of cases they are also the trustees to whom the management of the temporalities is committed. The elders and deacons are elected on the organization of a church by the male communicants, and subsequently

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either by the consistory or the male communicants, and in both cases their names are published to the congregation for approval. They hold office for two years, at the expiration of which term they may be reelected. The classis corresponds to the presbytery in the Presbyterian church, and is composed of a number of ministers, with elders delegated, one from each church within a certain district. The classis is a court of appeal from the judicial decisions of consistories. It approves of calls, dissolves pastoral connections, and ordains and deposes ministers. The particular synods, of which there are three, those of New York, Albany, and Chicago, are delegated bodies composed of two ministers and two elders from each classis within the bounds of the synod. These are courts of appeal from the decisions of the classes; they form new classes, and transfer congregations from one classis to another. The general synod is the highest court of appeal, and is composed of three ministers and three elders from every classis in the connection. It constitutes particular synods, appoints theological professors, has the management of the theological seminary and the various boards, and exercises a general supervisory power over the concerns of the church. It cannot alter or amend the constitution of the church, but may recommend alterations, which can be adopted only by the votes of a majority of the classes.—The reports of 1860 give the following statistics: particular synods, 3; classes, 31; churches, 870; ministers, 887; communicants, 50,427; contributions, \$125,010.82. "The Christian Intelligencer," which is devoted to the interests of the church and mainly supported by its members, is the oldest religious weekly in the city of New York next to the "New York Observer," having been established in 1828.

REFRIGERANTS. See FREEZING MIXTURES.

REFRIGERATOR, an ice chest in which articles of food are placed with ice for the purpose of keeping them cool, and thus preserving them from spoiling. This is an important American invention, introduced not many years since, and now almost a necessary article of household furniture. It is also of great service in market houses and upon freight trains, wherever fresh meat or fish is kept on hand, particularly in southern cities. In its common form it may be a mere box with shelves and a cover opening at the top, or doors at the side; but this is an objectionable arrangement both as regards economy of room and the admission of warm air whenever the chest is opened; and moreover meats are toughened and otherwise injured by contact with ice. In its most perfect form the refrigerator is lined throughout with zinc, leaving a space all around filled with air or any other good non-conductor of heat, as fine charcoal, &c. It is provided with drawers like those of a bureau, except that they do not extend quite to the back, a partition being placed so as to leave a space of about an inch

for the air to pass down from a shelf in the upper portion upon which lumps of ice are placed, being introduced through the top. A channel is made at the back edge of this shelf and against the partition to catch the water, and another is made on the bottom floor. In the bottom of each drawer, and also through the shelf upon which it slides, holes are made for the circulation of the air, which, passing down behind the partition, turns under it and flows up through the drawers to the front of the upper apartment which contains the ice. Whenever a drawer is partially opened and shut this circulation is promoted, and at all times it is kept up to some extent. A wire gauze box containing charcoal is placed in the upper part, in passing through which the air is disinfected of any gases arising from the decomposition of the food; and as it reaches this cold apartment it is condensed and deposits the particles of moisture it took up in passing over the articles in the drawers, and thus it returns purified and dried to circulate again. Railroad cars are constructed upon this principle, in which meat, butter, &c., are transported in summer eastward from the western states.

**REFUGIO**, a S. co. of Texas, on the gulf of Mexico, bounded N. E. by the Guadalupe river and Espiritu Santo bay, and S. W. by the Aransas, and intersected by the San Antonio, Mission, and other rivers; area, about 1,500 sq. m.; pop. in 1860, 1,600, of whom 234 were slaves. It has a level surface and a generally fertile soil. Aransas bay lies almost wholly in the S. part of the county. Capital, Refugio.

**REGENSBURG**. See **RATISBON**.

**REGGIO** (anc. *Regium Lepidi*), a town of N. Italy, capital of a district of the duchy of Modena, situated between the rivers Tassone and Crostolo, tributaries of the Po, 16 m. W. N. W. from Modena, and 15 m. S. E. by E. from Parma; pop. about 16,000. It is surrounded by ramparts and defended by a citadel. It has an ancient cathedral, adorned by many marble columns and fine statues. The principal square is ornamented by a statue traditionally said to represent Brennus, the Gallic leader. There are manufactories of silk and linen.—Reggio is supposed to have been founded by Æmilius Lepidus, who constructed the famous Æmilian way. Napoleon erected it into a dukedom for Oudinot. Here Brutus, the father of the tyrannicide, was put to death by Pompey, and Ariosto and Correggio were born. In the vicinity are the town and ruined castle of Canossa.

**REGGIO**, or **SANTA AGATA DELLA GALLINA** (anc. *Rhegium*), a walled town of S. Italy, capital of the Neapolitan province of Calabria Ultra I., situated in a plain on the E. coast of the strait of Messina, 9 m. S. E. of Messina in Sicily; pop. in 1850, 18,483. Silk, linen goods, and pottery are manufactured. The Apennines rise behind Reggio, but the surrounding plain is extremely fertile, and contains large groves of orange, lemon and citron trees. (See **RHEGIUM**.)

**REGILLUS**, LAKE OF, a small lake in Latium, where, in 498 or 496 B. C., was fought the battle which decided the fate of the last Roman king. Its site has been considered doubtful, but it is now generally supposed to be identical with the lake of Cornufelle, at the foot of the hill on which stands the town of Frascati (the ancient Tusculum), 12 m. S. E. of Rome; this lake was formed by a volcanic crater about  $\frac{1}{2}$  m. in diameter, and was artificially drained in the 17th century. Here Tarquin the Proud, having after the failure of Porsena's expedition enlisted the Latins in his cause, with his son-in-law Octavius Mamilius gave battle to the Romans under the dictator Albinus Postumius, was wounded and utterly defeated, and fled alone from the field. The chiefs on both sides were nearly all killed or wounded. According to the tradition, the Romans owed their victory to Castor and Pollux, who were seen to charge at the head of their cavalry, and who first made it known in the forum at Rome. There a temple was dedicated to them, where the day (July 15) was afterward annually celebrated.

**REGIMENT** (Lat. *regimen*, government, from *rego*, to rule), a body of troops, whether infantry, cavalry, or artillery, variously numbering from 800 to 2,400 men, and commanded by a colonel and one or more lieutenant-colonels and majors, according to the number of battalions into which it is divided. The battalions are in turn subdivided into companies, each of which is commanded by a captain and one or more lieutenants. The regiment forms the 8d subdivision of an army, two or more regiments constituting a brigade, and two or more brigades a division. Regiments originated in the French service about 1560, and within a few years the troops of the chief European armies were organized according to the new system.

**REGIOMONTANUS**, the Latin name of Johann Müller, a German mathematician (adopted from his native place, Königsberg in Franconia), born June 6, 1436, died in Rome, July 6, 1476. At the age of 12 he was sent to Leipsic to study, and after 4 years rivalled his teachers in knowledge of mathematics and astronomy. He then went to Vienna and became the pupil of Purbach, on whose sudden death in 1461 Müller was appointed to his professorship in the university, but before entering upon it went to Rome in company with Cardinal Bessarion to study the Greek language. In 1464 he gave a course of instruction at Padua upon the astronomical writings of the Arabian philosopher Alfergan, and in the same year returned to Vienna and entered upon the duties of his professorship. A few years later he removed to Buda, living at the court of King Matthias Corvinus, and in 1471 changed his residence to Nuremberg, where he formed an intimacy with Bernard Walter, a wealthy citizen, who furnished him with astronomical instruments and a printing press. He then commenced a series of important observa-



tions which demonstrated the incorrectness of the Alphonsine tables. In 1474 he published his *Kalendarium Novum*, for 1475, 1494, and 1513. This was the first astronomical almanac issued in Enrope, and the whole edition was speedily sold, though the price was 12 golden crowns. Pope Sixtus IV., to secure the services of Regiomontanus in the reformation of the calendar, appointed him archbishop of Ratisbon; and in July, 1475, he proceeded to Rome, but died before the work was commenced. He was the most learned astronomer that Europe had produced up to his time. To him we also owe the introduction of decimal fractions, and the science of trigonometry was developed by him to nearly its present condition.

REGNARD, JEAN FRANÇOIS, a French dramatist, born in Paris in 1647, or according to Beffara, Feb. 8, 1655, died Sept. 5, 1709. When 20 years old he inherited from his father a considerable fortune, and visited Italy, where he led a licentious life, and won largely in gambling. After a second visit, he set sail in 1678, in the same ship with a married Provençal lady with whom he had fallen in love, from Civita Vecchia for Toulon; but being captured by Algerine pirates, they were sold into slavery and taken to Constantinople, where he was employed as a cook. At the end of two years, with 12,000 livres sent by his family, he procured the release of himself and the lady. Hearing on their return to France that her husband was dead, Regnard was about to marry her when the husband reappeared. He then spent two years in northern travel, and returned to Paris in the beginning of 1683, to lead a life of luxury and elegance, writing plays, and engaging in a literary warfare with Boileau. In 1696 he produced at the *théâtre Français* his 5-act comedy *Le joueur*, one of the masterpieces of the French stage. He also wrote books of travel, &c. The last edition of his complete works is that of Alfred Michiels (2 vols. 8vo., 1855).

REGNAULT, HENRI VICTOR, a French physicist and chemist, born in Aix la Chapelle, July 21, 1810. He holds the position of engineer-in-chief of mines and director of the imperial manufactory of porcelain at Sèvres, and is also professor of physics at the college of France, and of chemistry in the polytechnic school. His attention has been devoted chiefly to heat in its combinations with matter, and he was the first to demonstrate that the latent heat of steam diminishes as the sensible heat increases, but in a slower proportion. He has also verified the law of Mariotte and Boyle on the compressibility of the gases. Accounts of his investigations on these subjects fill the 21st vol. of the *Mémoires* of the French academy of sciences. Analogous researches on the specific heat of solids and liquids, on hygrometry, on the respiration of animals and kindred topics, have from time to time been published in the *Annales de chimie et de physique*. He is also the author of an elementary treatise on chemistry, translated into several European languages.

RÉGNIER, MATHURIN, a French satirist, born in Chartres, Dec. 21, 1573, died in Rouen, Oct. 22, 1613. He was employed in the diplomatic service, and received from Henry IV. a pension of 2,000 livres. His works comprise 16 satires, 8 epistles, 5 elegies, and a few sacred and miscellaneous short poems.

REGULAR CLERKS OF ST. PAUL. See BARNABITES.

REGULUS (Lat., a petty king or chieftain), a name applied by the alchemists to antimony, from their belief that this metal would lead them to the discovery of the philosopher's stone. It was afterward applied to other metals, as bismuth, and is now used to designate the crude metal obtained in some smelting operations previous to its being refined. (See COPPER SMELTING.)

REGULUS, MARCUS ATILIUS, a Roman general, consul in 267 B. C., when he defeated the Sallentini, took Brundisium, and received the honor of a triumph. In 256, the 9th year of the first Punic war, he was a second time consul, and in conjunction with his associate, L. Manlius Vulso Longus, set out with a fleet of 830 vessels to invade Africa. The Carthaginian fleet of 350 sail, under Hanno and Hamilcar, encountered them, but the Romans were victorious, 94 of the enemy's vessels being either captured or destroyed. The Romans now passed over into Africa, landed at Clypea, and ravaged the Carthaginian territory. Toward the close of the year, by order of the senate, Manlius returned to Rome with his division of the forces. Regulus now captured town after town, including Tunis, within 20 miles of Carthage, having previously attacked the Carthaginian army in the mountains, where their cavalry and elephants could be of no service, and defeated it with a loss of 15,000 men killed and 5,000 taken prisoners. The Carthaginians sued for peace, but when the envoys protested against the extravagance of his demands, Regulus replied: "Men who are good for any thing should either conquer or submit to their betters." The negotiations were broken off, and Xanthippus, a Spartan, was placed at the head of the Carthaginian army, who defeated the Romans and took Regulus prisoner. After 5 years' captivity, he was sent (250) to Rome along with a Carthaginian embassy, on condition that he would return if the negotiations were unsuccessful. But instead of advocating peace, he dissuaded his countrymen from it, telling them that his own life was of no consequence, and that moreover a slow poison had been given him, of which he would soon die. When by his persuasions the senate refused to make peace, he returned to Carthage. It is said that he was killed in a chest, the inside of which was covered with iron spikes; and others relate that his eyelids were cut off, and he was then confined in a dark dungeon, from which he was suddenly exposed to the sun. The accounts of his execution are now generally disbelieved.



REICHENBACH, GEORG VON, a German mechanist and optician, born in Durlach, Baden, Aug. 24, 1772, died in Munich, May 21, 1826. In 1811 he entered the Bavarian service as inspector of salt works, and founded in conjunction with 8 others an establishment for making all the instruments necessary for geometrical and astronomical undertakings. Hitherto these had never been made with completeness and accuracy, while the instruments that were made at this establishment were all that was desired.

REICHENBACH, HEINRICH GOTTLIEB LUDWIG, a German botanist and zoologist, born in Leipsic, Jan. 8, 1798. He studied medicine and the natural sciences in the university of Leipsic, and after having been extraordinary professor there, went in 1820 to occupy the chair of natural history in the medical and chirological school of Dresden. He is a councillor of the court of Saxony, director of the museum of natural history and of the botanic garden, and a member of many scientific bodies. He has written numerous works, especially in the department of botany. Of these the most important is his *Flora Germanica*, accompanied by an *Iconographia Botanica* (17 vols., Leipsic, 1823-'54). In his later years he has turned his attention more to zoology, and has written *Regnum Animale* (1834-'6), still incomplete, and *Vollständigste Naturgeschichte* (1845 *et seq.*), a vast work particularly devoted to mammiferous animals and birds.

REICHENBACH, KARL, baron, a German naturalist, chemist, and metallurgist, born in Stuttgart, Feb. 12, 1788. He was educated at Tübingen, where he obtained the degree of doctor of philosophy. At the age of 16 he conceived the idea of establishing a new German state in one of the South sea islands; and for 3 years he devoted himself to this project, and had already secretly formed a large association in Würtemberg, when it was suppressed by the French authorities on suspicion that its real objects were political, and Reichenbach was arrested and imprisoned for some months. He next directed his attention to the applications of science to the industrial arts, visited most of the great manufacturing and metallurgical works of France and Germany, and established works of his own at Villingen and Hausach. In 1821, in connection with Count Hugo of Salm, he commenced a number of manufacturing operations in Blansko, Moravia, from which he soon secured an ample fortune; and about this time the king of Würtemberg conferred on him the title of baron. Reichenbach is particularly distinguished for his original scientific investigations. The first geological monograph which appeared in Austria was his *Geologische Mittheilungen aus Mähren* (Vienna, 1834). His position at the head of the large chemical works, iron furnaces, and machine shops upon the great estate of Count Hugo secured to him excellent opportunities for conducting his experimental researches upon a large working

scale. From 1830 to 1884 he was engaged in the investigation of the complicated products of the distillation of organic substances, and succeeded in discovering among them a number of compounds of carbon and hydrogen, the existence and useful properties of which were before entirely unknown. Among these are creosote, paraffine, eupion, pittacal (possibly the same substance as the dyes aniline and mauve), picamar, capnomor, &c. Under the name of eupion Reichenbach included the mixture of hydrocarbon oils now known as paraffine or coal oils; and in his paper describing the substance, first published in the *Neues Jahrbuch der Chemie und Physik*, B. ii., he dwells upon the future economical importance of this and of its associate paraffine, whenever the methods of separating them cheaply from natural bituminous compounds should be established. (See EUPION, PARAFFINE, and PETROLEUM.) Reichenbach afterward entered upon an investigation of the manner in which the human system is affected by various substances, and was led to conceive the existence of a new imponderable agent, allied to electricity, magnetism, and heat, which emanates from most substances, and to the influence of which different persons are variously sensitive. Although he had given no attention to animal magnetism, the subject was inevitably encountered by him in these researches; which, however, he pursued independently of all experiments and theories that had been made in that department. The new force, the existence of which he believed he had established, he called od, and he has published several works relating to it; as, *Physikalisch-physiologische Untersuchungen über die Dynamide des Magnetismus*, &c., (3 vols., Brunswick, 2d ed., 1849); *Odisch-magnetische Briefe* (Stuttgart, 1852 and 1856; Fr. ed., 1854; English translation by Drs. Ashburner and Gregory, London and New York); *Der sensitive Mensch und sein Verhalten zum Od* (2 vols., Stuttgart, 1854); *Wer ist sensitiv, wer nicht?* (Brunswick, 1856). (See OD.) Reichenbach has in his castle of Reisenberg, where he usually resides, very valuable scientific collections, among which that of meteorites is especially remarkable as one of the finest in the world; he also owns Sieber's great herbarium.

REICHSTADT, DUKE OF. See BONAPARTE, vol. iii. p. 471.

REID, MAYNE, a British novelist, born in the north of Ireland in 1818. He is the son of a Presbyterian minister, and was educated for the church, but, being fonder of adventure than of theology, set out in 1838 for America. Arriving at New Orleans, he engaged in trading and hunting excursions up the Red and Missouri rivers, and travelled through nearly every state of the Union. Subsequently he settled in Philadelphia, contributed to various journals, and when the Mexican war broke out joined the army, was present at several engagements, and was wounded in the assault upon Chapul-

tepec, where he led the forlorn hope. After the close of the war, Capt. Reid left New York in 1849 to fight for the Hungarians during their struggle with Austria; but by the time he reached Paris the insurrection had been quelled. He has since resided in London, and has written a series of very popular books for boys. Among his novels the best are: "The Rifle Rangers" (1849), "The Scalp Hunters" (1850), "The Quadroon" (1856), and "Osceola" (1858).

REID, THOMAS, a Scottish metaphysician, born in Strachan, Kincardineshire, April 26, 1710, died Oct. 7, 1796. He was graduated at Marischal college, Aberdeen, in 1726, and in 1736 was presented to the neighboring living of New Machar. It was his custom to preach the sermons of Tillotson and Evans rather than his own compositions, and he was already chiefly interested and engaged in studying metaphysics. In 1748 he published a paper in the London "Philosophical Transactions," in which he opposed the introduction of mathematical formulas into metaphysical and moral speculations, and particularly criticized the statement of Hutcheson that the benevolence or moral merit of an agent is "proportional to a fraction having the moment of good for the numerator, and the ability of the agent for the denominator." He was elected in 1752 professor of philosophy in King's college, his department comprehending logic, ethics, mathematics, and physics. His "Inquiry into the Human Mind on the Principles of Common Sense" (1764) aimed at the refutation of Hume's sceptical theory; and the work was submitted to Hume before publication, who wrote on returning it: "I have read your performance with great pleasure and attention. It is certainly very rare that a piece so deeply philosophical is wrote with so much spirit, and affords so much entertainment to the reader." Affirming the impossibility of proving the existence of an external world from reason, or experience, or instruction, or habit, or any other principle hitherto known to philosophers, Reid introduced the doctrine of an original instinct or common sense as the ground of the belief. In 1764 he was transferred to the university of Glasgow as successor of Adam Smith in the chair of moral philosophy. His course included metaphysics, moral philosophy, natural law, and political right. He was a member of a philosophical society before which he read several essays, including an "Examination of Dr. Priestley's Opinion concerning Matter and Mind," "Observations on the Utopia of Sir Thomas More," and "Physiological Reflections on Muscular Motion." In 1781 he withdrew from public duties in order to devote himself exclusively to philosophical studies. In 1785 he published his "Essays on the Intellectual Powers of Man," consisting of his academical lectures, and in 1788 his "Essays on the Active Powers of Man," his last important work. An edition of his works with notes and dissertations was prepared by Sir William Hamilton (incomplete, 1846).

REID, SIR WILLIAM, a British meteorologist, born at Kinglassie, Fifeshire, in 1791, died in London, Oct. 21, 1858. He was educated at the royal military academy at Woolwich, and entered the army as lieutenant of royal engineers in 1809. He served under the duke of Wellington in the peninsula, distinguishing himself on several occasions, was in America in the war of 1812, and again served under the duke in Belgium in 1815. In 1816 he took part, with the rank of captain, in the attack on Algiers. He subsequently became adjutant of the corps of sappers and miners, and a diligent student of science, and in 1839 was elected a fellow of the royal society. In 1838 he was appointed governor of Bermuda, and by his tact and skill greatly improved the agriculture of the island, which was in a deplorable condition at the time of his appointment. Through his efforts its vegetable products were introduced into the New York market, and there commanded high prices. His solicitude for the interests of the islanders endeared him greatly to them, and he is remembered to this day as "the good governor." He was appointed governor of the Windward islands in 1846, and in 1848 returned to England, and was appointed commanding engineer at Woolwich. During the great exhibition of 1851 he was actively engaged in the promotion of its objects, being a part of the time chairman of the executive committee. In Sept. 1851, he was appointed governor of Malta, and was knighted. He held that position through the Crimean war, and returned to England in 1858. Gen. Reid's interest in meteorology dates from 1831, when he was detailed to superintend the repairs of the injury done at Barbados by a severe hurricane. His inquiries first took definite form from the perusal of an article on the subject in the "American Journal of Science" of 1831, by Mr. W. C. Redfield, with whom he immediately opened a correspondence, which was maintained to the close of Mr. Redfield's life, and which has been deposited in the library of Yale college. Gen. Reid published "An Attempt to develop the Law of Storms by means of Facts, arranged according to Place and Time" (1838), and "The Progress of the Development of the Law of Storms," &c. (1849).

REIMARUS, HERMANN SAMUEL, a German scholar, born in Hamburg, Dec. 22, 1694, died there, March 1, 1768. He early devoted his attention to the study of languages, was educated at Jena and at Wittenberg, made in 1720 a journey through Belgium and a great part of England, became in 1723 rector in Wismar, and in 1727 received the professorship of the Hebrew language in the gymnasium of Hamburg, afterward united with the professorship of mathematics, which he held till his death. He married in 1728 the daughter of J. A. Fabricius, and his philological acquisitions were of great service in aiding the literary labors of his father-in-law. He wrote various works on classical and other subjects, and it is now proved

that he was the author of the celebrated "Wolfenbüttel Fragments," published by Lessing in 1774 and 1777. These investigations had been imparted by Reimarus only to his intimate friends, and by Lessing, who had secured a copy, they were edited as manuscripts belonging to the Wolfenbüttel library, of which he then had the charge.

REINAUD, JOSEPH TOUSSAINT, a French oriental scholar, born in Lambesc, Dec. 4, 1795. He was destined for the church, but went to Paris to attend the lectures of Sylvestre de Sacy, and made himself acquainted with Arabic, Turkish, and Persian. In 1824 he obtained a place in the cabinet of oriental manuscripts of the royal library, in 1832 became a member of the academy of inscriptions, and in 1838 succeeded Sylvestre de Sacy as professor of Arabic in the school of oriental languages. Since 1847 he has constantly been elected president of the Asiatic society, of which he was one of the founders. He has written much on subjects connected with oriental literature and history.

REINDEER. See CARIBOU.

REINHARD, FRANZ VOLKMAR, a German Protestant theologian and pulpit orator, born in Vohenstrauß, near Sulzbach, Bavaria, March 12, 1753, died in Dresden, Sept. 6, 1812. He was educated at the university of Wittenberg, where he became assistant of the philosophical faculty in 1778, extraordinary professor of philosophy in 1780, and ordinary professor of theology in 1783. In 1792 he went to Dresden as chief chaplain in ordinary, church councillor and assistant judge of the consistorial court, and there remained until his death. He was highly distinguished as a pulpit orator, and wrote numerous theological works.

REINHOLD, KARL LEONHARD, a German philosopher, born in Vienna, Oct. 26, 1758, died in Kiel, April 10, 1823. He was born of Catholic parents, who designed him for the church, and in 1772 entered the Jesuit school of Santa Anna in Vienna. After the abolition of the society of Jesuits in 1773 he repaired to the college of the Barnabites, where he became master of the novices and teacher of philosophy. From this station he escaped in 1783 by flight, and after a short stay in Leipsic went to Weimar, where he made the acquaintance of Wieland, whose daughter he soon after married, and whom he assisted in editing the journal *Der Deutsche Mercur*. In 1787 he became professor of philosophy in Jena, and in 1794 went to Kiel, where he occupied the same position and was also Danish state councillor until his death. Reinhold was in his own time an influential philosopher, and was the first to interpret and disseminate throughout Germany the philosophical opinions of Kant. His works were numerous.

REISKE, JOHANN JAKOB, a German philologist and orientalist, born in Zörbig, near Leipsic, Dec. 25, 1716, died in the latter city, Aug. 14, 1774. When 12 years old he was sent to

the orphan school at Halle, and in 1733 entered the university of Leipsic, where he acquired an extensive knowledge of Arabic, and in order to obtain books in that tongue deprived himself of almost the very necessities of existence. Leyden was then the seat of the study of Arabic, and to that city he travelled on foot. There to support himself he became a corrector of the press, while his leisure hours were spent in ransacking the oriental treasures of the university library. He also studied medicine, and after remaining in Leyden 8 years amid privations which made him gloomy and hypochondriac, he returned to Leipsic in 1746. He received the title of professor of Arabic in 1748, but had nevertheless to struggle constantly with adverse circumstances until 1758, when he obtained the rectorship of the St. Nicholas school in Leipsic. He edited a large number of Greek and Arabic works.

REISSIGER, KARL GOTTLIEB, a German composer, born in Belzig, near Wittenberg, Jan. 31, 1798. He was intended for the church, but devoted himself to music. He has been professor at the musical institution of Berlin, and upon the death of Weber succeeded him as chapelmaster at Dresden. His most successful operas are the *Felsenmühle*, *Libella*, *Turandot*, *Adèle de Foix*, and the *Schiffbruch der Medusa*. He is however better known by his minor pieces, particularly his songs for the base voice, of which the "Two Grenadiers" of Heine is a favorable specimen.

RELIGIOUS ORDERS, the technical name for associations of men or women in the Roman Catholic church and the oriental churches, whose members live in common in convents. The history of these associations is given in the article MONACHISM. The common bond of union among all the religious orders, and which distinguishes them from other classes of associations, is retirement from the world, celibacy, and their organization, by means of solemn vows, into communities of an entirely ecclesiastical character. They are divided into four classes, as follows. 1. Monks proper, *i. e.*, the associations which follow the rule of St. Basil or St. Benedict. All the religious orders of the eastern churches follow the rule of St. Basil. The Latin church has only a few convents of Basilian monks, the Benedictine order having spread so rapidly as to take sole possession of her entire territory. Numerous monastic organizations branched off from the Benedictines, the most important of which are the Camaldules, the Carthusians, the Cistercians, the Celestines, the orders of Fontevault and of Grandmont, and the Trappists, the origin of all of which with the exception of the last is prior to the 13th century. 2. The canons regular, who follow the rule of St. Augustine, and have never occupied a prominent position in the history of religious orders. In contradistinction from monks, who organized into communities individuals wishing to flee from the world, the canons regular were associations

of priests who established a religious organization in order to prepare themselves for a better discharge of their priestly functions. The Premonstratensians and the Trinitarians were properly associations of regular canons, but in some points of their constitution were more like monks. 8. The friars or mendicant orders, whose characteristic distinction was the application of the vow of poverty, not only to individual members, but also to the corporation in general. There are four main branches of the friars, viz., the Dominicans, Franciscans, Carmelites, and Augustinians, with a number of less important orders, as the Servites, Minims, and others. 4. The regular clerks, who are, like the regular canons, associations of priests, but do not like the latter bind themselves to fasting and abstinence, to night watches and silence. This class originated at the beginning of the 16th century with the foundation of the Theatines, who were soon followed by the Barnabites, and by the celebrated order of the Jesuits.—The official language of the Roman Catholic church recognizes only these four classes as religious orders, but it is usual, both in common speech and in the general histories of monachism, to include also a large number of associations of secular priests, who live in common, but bind their members either by "simple" vows only or by none at all. The church distinguishes them from the orders by the name of congregations. The first impulse to their foundation was given by the success of the Jesuits, and the rules of most of them are based upon that of the Jesuits. They have become very numerous, and are mostly devoted to educational (see SCHOOL BROTHERS) or missionary purposes. The Lazarists, Oratorians, Sulpicians, and brethren of the Christian schools are the most important among them. Beside these congregations, the "orders of knighthood," who were a kind of military monks, are also commonly classed among the religious orders. Their mission was to defend Christianity against the attacks of non-Christian nations, and to the performance of this mission they bound themselves by a special fourth vow. The military orders of the church, nearly all of which are now extinct, were the following: the knights of St. John, the templars, the Teutonic knights, and the orders of Alcantara, Calatrava, Aviz, and St. Maurice.—The members of the religious orders wear a peculiar monastic dress, either constantly or at least while at home; many orders, during divine service, exchange it for a festive or church dress. The laws which the founders, with the ratification of the pope, have given for the government of the order, are called the monastic rule. To most of the religious orders, soon after their formation, nuns of the same rule, and frequently of the same name, attached themselves. They were often called the second branch of the order, and their convents generally were under the ecclesiastical jurisdiction of the priests of the order. Beside the nuns, most of the or-

ders received numerous additions by admitting lay brothers (*fratres conversi*) or lay sisters (*sorores conversæ*), who were charged with the performance of the house work and with keeping up communication with the world. When a new and universal enthusiasm for the monastic life sprang up under the influence of the mendicant orders, a large class of persons wished to secure the ecclesiastical privileges of the order without entering the convent or leaving their position in the world; and for this purpose St. Francis of Assisi organized such persons into a "third order," commonly called Tertiarians, an institution which was adopted by all the other mendicant and several other orders.—As to government, the oldest orders were republican aristocracies. The monasteries of the Benedictines remained for a long time independent of each other, and the Cistercians were governed by a high council, which was responsible to a general chapter, consisting of all the abbots and provosts of the order. The powerful orders, such as the Benedictines, early obtained exemption from the jurisdiction of the bishops, being governed by prelates of their own, known as mitred abbots, and the weaker ones gradually followed their example. The mendicant orders obtained entire independence of the bishops from the beginning, in reference to certain privileges whose immunity was guaranteed by special papal rescripts. The constitution of the mendicant orders had the appearance of a military monarchy, and its efficiency was found to be so great, that it was adopted or imitated by most of the other orders. At the head of the order is a "general," whose residence is at Rome, and who is subordinate to the pope only. The territory of the order is divided into provinces, at the head of each of which is a "provincial." A province consists of a number of convents, designated by various names, as monasteries, houses, colleges, abbeys, &c. The heads of the convents bear likewise different names, as abbots, provosts, superiors, guardians, rectors, &c. In the mendicant and most of the other orders all the offices are elective. The superiors of the convents are chosen by the members, and they in turn elect the provincial; all the provincials, assembled in a general convention, usually called the general chapter, elect the general of the order, and, in most orders, a council of advisers (*definidores*). In some orders, however, as that of the Jesuits, the provincials and the superiors of the houses are appointed by the general.—The Protestant churches, in general, have declared themselves opposed to the fundamental principle of monastic institutions, though Luther on several occasions expressed his approbation of religious communities of men and women. In modern times several such communities, living in common and binding themselves to the observance of a rule, have been formed. In the church of England an institution of sisterhoods has been considerably extended under the auspices of the so called high church

party. Of much greater importance, because much more numerous, are the houses of deacons and deaconesses in Germany, the members of which devote themselves to educational and charitable labors. The most important associations of this kind are the brethren of the rough house (*das rauhe Haus*), near Hamburg, founded in 1833 by Dr. Wichern, and the deaconesses of Kaiserswerth, founded by the Rev. Mr. Fliedner in 1836. The latter association counted in 1860 more than 300 sisters, laboring in 4 divisions of the world, at 76 stations, of which several are in European and Asiatic Turkey, in Egypt, and the United States of America (at Pittsburgh).

REMAINDER, in law, an interest in that which remains of a whole estate, after a partial or particular estate, as it is called, which was reserved out of the whole, has been determined. Like many other branches of the common law, it had its foundation in the feudal polity. In the long lapse of time, and under the influence of other branches of the English real property law, the learning of remainder has been wrought out into manifold distinctions and refinements. Sir Edward Coke says a remainder is "a remnant of an estate in land, depending upon a particular prior estate, created at the same time and by the same instrument, and limited to arise immediately on the determination of that estate, and not in abridgment of it." Thus, if a man who is seized in fee of lands, grant them to A for 20 years, and, after that term has expired, to B and his heirs forever, A is tenant for years, and B has remainder in fee. But the residue of the estate after A's term may be still subdivided; for example, the limitation to B may be for life, then a limitation to C in tail, remainder over to D in fee. It matters not how many partial estates may be thus successively reserved or carved, as the phrase is, out of the fee; all together, with the final limitation, form one whole estate.—It is one of the cardinal rules respecting remainders, that no remainder can be limited upon or after the grant of an estate in fee, for the fee is the whole and there can be nothing left. Nor can there be a remainder without a prior partial estate. This partial or particular estate is also essential to the existence of any subsequent remainder that amounts to a freehold; for, by an old rule of the common law, a freehold cannot be created to commence *in futuro*, but must commence at the time of the grant; and inasmuch as, with all partial estates, the remainder forms but one whole, delivery of possession to the first particular tenant vests possession in the freehold tenant also. The seisin which the grantor gives to the first taker is transmitted by him, and by each, to his successor, until it passes at last to the first remainderman. Each estate supports that which follows it. Hence arises another cardinal rule, that the remainder must vest in the grantee during the continuance of the partial estate, or on the instant that it is determined. Thus, if

A and B be joint tenants for life, remainder to the survivor in fee, on the death of A the joint estate is severed; B becomes in the moment of A's death the designated remainderman, and the remainder is good. But if the limitation be to A for life, remainder to the son of B in tail, and A die and so his estate determine before B have a son, then the remainder fails.—Remainders are either vested or contingent. They are vested when there is an immediate right of present enjoyment, or a present fixed right of future enjoyment, it being the present capacity of taking effect in possession if the possession were to become vacant, and not the certainty that the possession will become vacant before the estate limited in remainder determines, that distinguishes a vested remainder from one that is contingent. Thus a limitation to A for years, remainder to B and the heirs of his body, gives B a vested remainder, for he is capable of taking should the particular estate fall in, though it is not certain that he will not die without heirs before A's death. A contingent remainder depends on an event or condition which may either never happen or be performed, or not till after the determination of the preceding estate; or, to use the definition of the New York statute, which Chancellor Kent commends for its brevity and precision, a remainder is contingent while the person to whom or the event upon which it is limited to take effect remains uncertain. An example of a remainder contingent as to the person would be a limitation to A for life, remainder to B's eldest son (as yet unborn) in tail. This last limitation is contingent, because it is uncertain whether a son will be born to B; and if A die before that happens, the remainder is gone. A case of contingency in respect to the event would be presented by a limitation to A for life, and in case B survives him, then to B in fee. Here the uncertainty of B's surviving A is that which renders the remainder a contingent one.—The English doctrine of remainders, that is, the common law doctrine, remains unaltered in most of the United States. In one or two states slight changes, and in New York some which are quite material, have been made by statutory provisions.

REMBRANDT VAN RYN (PAUL GERRITZ), a Dutch painter, born on the banks of the Rhine (whence his surname), near Leyden, June 15, 1606, died in Amsterdam, Oct. 8, 1669. He was the son of a miller, Hermann Gerritz, who, being in comfortable circumstances, destined him for one of the learned professions. Rembrandt however made little progress in classical studies, but evincing a taste for painting he was placed by his father with Jacob van Zwaanenburgh, an artist of Amsterdam, after which he studied under Peter Lastman and Jacob Pinas. Returning home about the age of 20, he fitted up a studio in his father's mill, and commenced the practice of his art. It is supposed that from noticing the effects produced upon surrounding objects by the one ray

admitted into the lofty chamber of the mill from the small window which formed its ventilator, he may perhaps have derived those notions of color and powerful contrasts of light and shadow which subsequently made him the great master of chiaroscuro. In 1630 he established himself in Amsterdam, where in a short time he rose to great eminence. His pictures brought large prices, pupils flocked to him from all parts of northern Europe, for the instruction of each, of whom he received 100 florins a year, and from his etchings, which he produced in great numbers and which were esteemed as highly as his paintings, his profits were also considerable. He was naturally avaricious, but the stories told to his disadvantage in this respect are for the most part fabrications; as, notwithstanding his artistic emoluments, he was in 1656, many years before his death, declared insolvent, and died in comparative poverty. He mingled little in polite society, the burgomaster Van Sixt, one of his chief patrons, being almost his only associate among the higher classes, but passed his hours of recreation at the ale house. As a historical painter Rembrandt took a position in many respects opposed to the practice of previous or contemporary masters, his principle being that the imitation of vulgar nature was preferable to the cultivation of ideal beauty; and his manner depends upon the elaboration of a single element in art, that of light and shade. Obtaining this, he cared little for conventional excellence, and his pictures exhibit a meanness and coarseness of design, an incorrectness of drawing, and an incongruity in the costumes and other accessories, which would appear monstrous if they were not relieved by marvellous effects of chiaroscuro and coloring. He made no scruple of habiting the most sacred personages in grotesque attire, and was equally indifferent whether the costume was in keeping with others in the same picture, or appropriate to the time and occasion. In like manner his models of form were selected apparently for their ugliness. "The female forms of Rembrandt," says Fuseli, "are prodigies of deformity; his males are the crippled produce of shuffling industry and sedentary toil;" but the same critic also remarks that he was "a genius of the first class in whatever relates not to form." In his portraits he appears to much better advantage, the vulgarity of his design and the impropriety of costume being less apparent. Among his chief productions in this department may be mentioned the picture of "Nicholas Tulp dissecting in the Presence of his Pupils," in the museum of the Hague, one of his earliest pictures; the *Staalmeesters*, or council of one of the guilds of Amsterdam, in the museum of Amsterdam, by many esteemed his masterpiece; the "Shipbuilder and his Wife," in the collection of the queen of England; the "Jew Merchant," in the British national gallery; and the "Night Watch," in the museum of Amsterdam, a large composi-

tion representing the armed burgesses marching out to fire at a mark. Of his historical pictures the most remarkable are: "Duke Adolphus of Gueldres threatening his Father" and "Moses destroying the Tables of the Law," in the Berlin museum, both cited by Kugler to show the excellence of his style when the subject represented accords with his own gloomy and powerful mind; the "Sacrifice of Abraham," in the Hermitage at St. Petersburg; the "Woman taken in Adultery," in the British national gallery, which a descendant of the burgomaster Van Sixt sold to Mr. Angerstein for £5,000; the "Descent from the Cross" and the "Nativity," in the same collection; and the "Christ in the Garden with Mary Magdalene," and "The Adoration of the Magi," in the collection of Queen Victoria. Of his landscapes, of which he painted fewer than of other kinds of pictures, a characteristic specimen is that known as "Rembrandt's Mill" in the collection of the marquis of Lansdowne. In all his later pictures his attention was chiefly occupied in the production of effect. His peculiar style is perhaps more strikingly displayed in his etchings than in his paintings. They were a great source of profit to him, and one, "Christ healing the Sick," was called the "Hundred Guilders," from the fact that he refused to sell it for less than that sum. A good impression of the plate is now worth \$300. His paintings, of which 640 are specified in Smith's *Catalogue raisonné*, are variously estimated at from \$500 to \$20,000. The best of them are still owned in Holland. The most recent and authentic account of his life is one in Dutch by P. Scheltema, published in 1853. See also his "Life and Works," by J. Burnet (1848).

REMONSTRANTS. See ARMINIANS, and ARMINIUS.

REMORA. See SUCKING FISH.

REMUS. See ROMULUS.

RÉMUSAT, JEAN PIERRE ABEL, a French orientalist, born in Paris, Sept. 5, 1788, died June 4, 1832. His father had been surgeon to the king, and the son studied medicine, but had previously commenced, with but slight facilities, the study of the Chinese language. To this, with the Mantchoo and allied tongues, he continued to apply himself, aided by works lent him by the abbé De Tersan, and others procured for him by Sylvestre de Sacy from Berlin and St. Petersburg. In 1811 he published an *Essai sur la langue et la littérature Chinoises*, and a *Mémoire sur l'étude des langues étrangères chez les Chinois*. In 1813 he received the degree of M.D., and was appointed assistant surgeon of the military hospitals of Paris, and in 1814 performed effective service among the great number of wounded soldiers collected there. In 1814 a professorship of the Chinese and Mantchoo languages was created for him at the college of France, which he continued to hold until his death. He was also overseer of the oriental manuscripts in the imperial library, and president of the Asiatic so-

ciety, of which he was one of the founders. In 1829 he founded with others the *Universel*, a political and literary journal, designed to sustain the government of Charles X. and the ministry of Prince Polignac; but the revolution of 1830 left him undisturbed in the enjoyment of his offices. He left several important works on oriental philology.

**RENAISSANCE** (Fr.), a term applied to a peculiar style of architecture and ornamentation, founded on the antique, which took its origin in Italy about the commencement of the 15th century. The term, which signifies literally a revival or new birth, is also applied to the period commencing with the 14th and ending with the first half of the 16th century, which witnessed the revival of classical literature and the fine arts in southern Europe.

**RENAN, JOSEPH ERMEST**, a French philologist, born in Tréguier, department of Côtes-du-Nord, Feb. 27, 1823. He was destined for the church, went to Paris to prosecute his studies, and there began the study of Hebrew, Arabic, and Syriac, and in 1847 obtained the Volney prize for a treatise on the Semitic languages, afterward published as the first part of a *Histoire générale et système comparé des langues Semitiques* (8vo., 1848). He was sent out by the academy of inscriptions and belles-lettres in 1849 on a literary mission to Italy, and brought back materials of a work on the philosopher Averroes, which was published in 1853. In 1850 he was attached to the department of manuscripts in the national library, and in 1856 was elected a member of the academy of inscriptions and belles-lettres to succeed Augustin Thierry. In addition to the works already named, Renan has published several treatises on comparative philology, and translations of scriptural books with critical introductions, and contributed much to periodicals.—On the occupation of Syria by the French in 1860, he was sent out with the army at the head of a scientific commission, explored the sites of Tyre and Sidon, the Lebanon, and other localities, and made in the course of his excavations many interesting discoveries, an account of which is contained in his report presented to the emperor Napoleon III. in 1861.

**RENFREW, a N. E. co. of Canada West**, separated from Canada East by the Ottawa river, and drained by a number of its tributaries, the principal of which are the Madawaska, the Bonne Chère, and the Petawauwe, all of which intersect the county; area, 1,333 sq. m.; pop. in 1851, 9,415. Its surface is rough and hilly, interspersed with many small lakes, and the soil generally fertile. Capital, McNab.

**RENFREWSHIRE, a W. co. of Scotland**, bounded N. by the river Clyde, which separates it from Dumbarton, E. by Lanark, S. by Ayr, and W. by the frith of Clyde; area, 234 sq. m.; pop. in 1851, 161,091. The chief towns are Renfrew, Greenock, Paisley, and Port Glasgow. The whole county is included in the basin of the Clyde, and its E. part is within the great

coal district of the W. of Scotland. Alum and iron are produced in large quantities. Renfrewshire returns one member to parliament.—The Stuart family had their earliest known patrimonial inheritance in the parish of Renfrew in this county, and it is from this circumstance that the prince of Wales derives his title of baron of Renfrew.

**RENI, GUIDO.** See GUIDO RENI.

**RENNELL, JAMES**, an English geographer, born near Chudleigh, Devonshire, in 1742, died in London, March 29, 1830. He entered the navy at an early age as a midshipman, and served in India. At the age of 24 he entered the corps of engineers in the East India company's service, distinguished himself in the campaigns of Lord Clive, and was made a major, and afterward surveyor-general of Bengal. In 1788, his geographical works having attracted attention, he was elected a fellow of the royal society. In 1798 he assisted Mungo Park in the preparations for his journey in Africa, and afterward illustrated his travels by a map. He was buried in Westminster abbey. The works by which Rennell is best known are "The Geographical System of Herodotus Examined and Explained" (4to., 1800), and "Observations on the Topography of the Plain of Troy" (4to., 1814). Among his other works are: an atlas of Bengal, and a map of Hindostan, with a memoir; an "Elucidation of African Geography;" "A Treatise on the Comparative Geography of Western Asia;" "Illustrations of the Expedition of Cyrus, and the Retreat of the Ten Thousand;" and "An Investigation of the Currents of the Atlantic Ocean."

**RENNES**, a fortified town of France, capital of the department of Ille-et-Vilaine, situated at the junction of the rivers Ille and Vilaine, 213 m. W. S. W. from Paris; pop. in 1856, 35,665. The court house is an ancient edifice, in which the estates of Brittany used to meet. There are several important schools and a library of 30,000 volumes. Linen, woollen, leather, and pottery are manufactured. The Vilaine is navigable for barges, and canals lead to Brest, St. Malo, and Nantes.—The ancient name of the town was Condatis, and the modern appellation of Rennes has been derived from a people called Redones, who made it their capital in the time of the Romans. When the empire was dismembered it came into the hands of the Franks, and in the 9th century it was taken by Nominoë, prince of the Bretons. His successors made it their capital till it became united to France by the marriage of Anne of Brittany to Charles VIII. It was a place of great strength during the middle ages, and withstood several sieges, the most remarkable of which was that of the English under the duke of Lancaster, who was obliged to retire after continuing it 6 months.

**RENNET**, or **RUNNET** (Dutch *runnen*, to curdle), a preparation of the inner membrane of the stomach of a young calf, or sometimes that of a pig, used for coagulating the albumen in



milk and producing curd and whey, especially in the manufacture of cheese. Various methods of preparing it are in use. One of the best is as follows. The stomach of a newly killed calf is examined and cleaned of every thing except the curdled milk. Two handfuls of salt are put into and around the bag, and it is left to dry for a year or more in a warm place. When required for use, the bag is cut into small pieces, and these with some salt are put into a jar with soft water, that has been boiled and cooled down to 65°; or new whey may be used instead of the water, the quantity of either varying from 3 pints to 2 quarts, according as it is the stomach of a new-born calf or of one fed 4 or 5 weeks. After standing in the jar 2 or 3 days the liquid is strained off and another pint of the same is placed upon the mass. In 3 days this is added to the first infusion; and the fluid, when strained and bottled, is ready for use. A table spoonful of it will coagulate 80 gallons of milk in 10 minutes. The bag is also salted down without its contents, and afterward dried, and again salted with the addition of lemons, and sometimes of herbs, to give it a pleasant flavor. For the method of using it, see CHEESE.

RENNIE, JOHN, an English architect and constructive engineer, born at Phantassie, Haddingtonshire, June 7, 1761, died in London, Oct. 16, 1821. At 12 years of age he was placed with a millwright, with whom he remained for about two years; and after having studied mathematics two years at Dunbar, he attended at Edinburgh the lectures on mechanical philosophy and chemistry of Profs. Robinson and Black. He settled in London in 1780, and engaged in the construction of steam engines and machinery, in which he introduced great improvements. He afterward planned and superintended many of the great engineering works of England, among others the stone bridge at Kelso, below the junction of the Tweed and Teviot, and the Waterloo bridge over the Thames at London. (See BRIDGE, vol. iii. p. 689.) He constructed the Kennet and Avon canal from Bath to Newbury, and the London docks and the East and West India docks at Blackwall were executed from his plans and under his superintendence. He was buried in St. Paul's cathedral.—GEORGE, an English civil engineer and machinist, son of the preceding, born in Surrey, Jan. 3, 1791. He studied at St. Paul's school, London, and at the Edinburgh university, assisted his father in many of his great works, and in 1818 was made keeper of the money dies in the mint. He afterward became associated with his brother, Sir John, civil engineer, in continuing the various works left unfinished by their father, and in other enterprises. Mr. Rennie is the author of "Experiments on the Strength of Materials," "The Frictions of Solids," and "The Frictions of Fluids."

RENSSELAER, an E. co. of N. Y., bordering on Vermont and Massachusetts, bounded

W. by the Hudson river, and drained by the Hoosick and Little Hoosick rivers, and Kinderhook creek; area, 690 sq. m.; pop. in 1860, 86,325. Its surface is rough and hilly, two ranges of mountains, Taghkanick and Petersburg, traversing it from N. to S. They have an elevation of from 1,000 to 2,000 feet, with precipitous declivities, studded with numerous small lakes, and affording many picturesque views from their summits. The soil is generally hard and sterile, but much of it is under cultivation, yielding liberal crops. The productions in 1855 were 898,418 bushels of Indian corn, 558,377 of oats, 16,041 of wheat, 299,864 of rye, 596,559 of potatoes, 58,557 tons of hay, 1,291,738 lbs. of butter, and 538,462 of cheese. There were 8 cotton and 4 woollen factories, 7 furnaces, 18 tanneries, 84 grist and 91 saw mills, 10 newspaper offices, 114 churches, and 29,744 pupils attending public schools. The Troy and Greenbush, an extension of the Hudson river railroad, the Albany and West Stockbridge, the Troy and Boston, the Troy and Bennington, and the Albany, Vermont, and Canada railroads run through the county. Capital, Troy.

RENVILLE, an E. co. of Minn., intersected by the Minnesota river, and drained by its branches, the principal of which are Pegutazizi, the Tchanskayapi, or Red Wood, and the Warager; area, about 3,000 sq. m.; pop. in 1860, 245. The county is yet unorganized.

RENWICK, JAMES, LL.D., an American author and physicist, born about 1785. He was graduated at Columbia college, New York, in 1807, and in 1820 was elected professor of chemistry and physics in that institution, which position he held till 1854. In 1838 he was appointed by the government one of the commissioners for the exploration of the N. E. boundary between the United States and New Brunswick, an exploration which led to the Ashburton treaty in 1842. Prof. Renwick is the author of the biographies of Robert Fulton, David Rittenhouse, and Count Rumford, in Sparks's "American Biography;" of a "Memoir of De Witt Clinton" (New York, 1834); of a "Treatise on the Steam Engine," and of one on the practical applications of the principles of mechanics (New York, 1840). His "Outlines of Natural Philosophy" (2 vols. 8vo., Philadelphia, 1832) was the earliest extended work on that subject published in the United States; and his "Outlines of Geology" (New York, 1838) preceded by several years any other school treatise on that subject. He has also published text books on chemistry and philosophy for the use of schools.

REPLEVIN (law Lat. *re*, back, and *pledium*, pledge), a redelivery of a thing to the owner, upon pledges or security; the taking from some holder property which the taker claims, he giving back pledges to establish his right, or, if he fails in this, to return the property. The institution of this very important action is ascribed to Glanvil, chief justice to Henry II.; and it was originally the peculiar and exclusive



remedy in cases of wrongful distress. The object was to prevent the beasts of the plough, cattle, and other goods of the tenant in arrear from being unjustly or excessively distrained by the landlord, lest, as Littleton observes, "the husbandry of the realm and men's other trades might thereby be overthrown or hindered." At the common law a distress (which implies both the thing taken and the manner of taking it) was considered merely as a pledge or security for the rent, for damage feasant, or for service due from the tenant to his superior lord, and a means of enforcing its payment or performance. It could not be sold or disposed of by the distrainer, but he was compelled to hold it as a pledge until payment or other satisfaction was made. For this reason, until the law was altered by statute 2 William and Mary, 1, c. 5, which authorized the distrainer, with the assistance of the sheriff, to have the distress appraised by competent appraisers, and sold for the highest price which it would bring, unless regularly replevied by the tenant or owner within 5 days after seizure, beasts of the plough and the tools of a man's trade could not be distrained, lest by depriving him of these he should also be deprived of the ability to redeem them. There were two ways in which a distress could be replevied, one according to the common law, and the other by statute. The common law allowed the owner a writ *de replegiari facias*, which was sued out of the court of chancery and directed to the sheriff of the county in which the distress was taken, commanding him to redeliver it to the owner upon receiving sufficient sureties therefor, and afterward to determine the ownership and do justice as to the matter in dispute between the parties, in his county court. The statute of Marlbridge, on the other hand (52 Henry III., c. 21), provided that, without suing out a writ, the sheriff or any of his deputies (of whom 4 were appointed in each county for the express purpose of making replevins) should, immediately upon complaint being made to him, proceed to replevy the goods. The owner was then obliged to give satisfactory security to two ends: first, *plegios de proseguendo*, or pledges to prosecute his suit to final judgment; and second, *plegios de retorno habendo*, or pledges to return the distress again to the distrainer, if the right should be determined against him. These pledges were discretionary, and the sheriff was responsible for their sufficiency; and in addition to them the statute required a bond with two sureties, for double the value of the goods taken, also conditioned to prosecute the suit and return the goods. This bond was to be assigned to the avowant or person making cognizance, on request to the officer, and if forfeited it could be sued by the assignee. If the sheriff neglected to take a bond, or if he accepted insufficient pledges, the party might have an action against him and recover double the value of the goods distrained, but no more. In special cases the common law allowed

a man to have replevin of goods not distrained; as, if the mesne lord put his own cattle in place of those of the tenant *paravail*, or lowest tenant, whom he was bound to acquit, he might have replevin of these cattle though they never had been distrained. The owner of goods distrained might also replevy them although his grant by deed contained a special condition that the distress should be irreplevisable, and that the landlord should keep it as a gage or pledge until the rent were paid; because it was held to be incompatible with the nature of a distress that it should be irreplevisable, and in an old case of this nature the court awarded "that the defendant should gage deliverance or else go to prison." The sheriff, upon receiving the required security, was at once to cause the distress to be returned to the party from whom it was taken, unless the distrainer himself claimed the goods as his property; for if they were, the law permitted him to keep them, irrespective of the manner in which he had regained possession. If therefore the distrainer claimed any such right or property, the party replevying was obliged to sue out another writ called a writ *de proprietate probanda*, by which the sheriff was to determine, by an inquest, who was really the owner of the property before the distress was levied thereon. If it were decided against the claim of the distrainer, the sheriff proceeded to replevy as if no such claim had been made; but if his claim was found to be good and valid, the sheriff could proceed no further, but was to return the claim to the court of king's bench or common pleas, to be there prosecuted and finally decided. The goods, in ordinary cases, being delivered back by the sheriff to the party replevying, he was then compelled to prosecute his suit or action of replevin in the county court, though either party might remove it to the superior court of king's bench or common pleas; and indeed, in order to save trouble and delay, it was usually carried up in the first instance to the courts of Westminster hall, because if, in the course of proceeding in the county court, any right of freehold came in question, the sheriff could proceed no further. Upon action being brought, the distrainer, who was now the defendant, made avowry; that is, he avowed taking the distress, and set forth the right in which and the cause for which he took it, as for rent in arrears, damage done, or other cause; or if he justified in another's right, as bailiff or servant, he was said to make cognizance; that is, he acknowledged the taking, and claimed that it was legal as being done at the command of one who had a right to levy the distress; and upon the legal merits of this avowry or cognizance the cause was determined. If the action were decided in favor of the plaintiff, and the distress declared to be wrongful, he was entitled to keep the goods which he had already got back into his possession, and in addition should recover damages for the wrongful seizure and detention; but if the defendant prevailed, he

should have a writ *de retorno habendo*, by which the distress was returned into his possession irreplevisable, to be sold or otherwise disposed of, as if it had never been replevied. If the debtor had in the mean time disposed of or concealed the distress, so that it could not be found, execution issued against his other goods, and for want of them against his body in the nature of a writ of *capias*. While distresses continued to be held as mere pledges, if the former owner, after judgment against him, offered the distrainor the arrearages or other damages due, and he refused thereupon to deliver up the distress, the plaintiff might bring an action of detinue, and by that means recover its possession. If, while a replevin for a former distress was pending, a man distrained again for the same rent or service, the party was not obliged to bring another action of replevin for the second distress, but could have a writ of recaption and recover the goods with damages for the distrainor's contempt of the process of the law.—Formerly a mere possessory right was not sufficient to entitle a party to maintain replevin; but now it is sufficient if the plaintiff can prove a general or special property in the goods, with the right of immediate and exclusive possession, either as mortgagee, owner, agent, or bailee, without actually having such possession at the time. Though replevin was formerly confined to cases of wrongful distress, it is now the proper form of action by which to recover the specific thing taken, in all cases where goods have been tortiously taken or detained, whether by distress or in any other manner, together with damages for the detention, unless the taking and detention can be justified or excused; and it is one of the most important and frequently used modes of legal remedy. The forms and manner of proceeding, with some slight alterations, remain the same now as formerly, as far as the redelivery of the goods to the party claiming them, the giving of bonds with sureties in double the value of the goods, the prosecution of the action, and the final judgment and execution are concerned. In a few of the United States it is still confined, as formerly in England, to cases of wrongful distress; but in most of the states its operation is much more extensive, and in some of them it is the only action which now lies for the specific recovery of any thing wrongfully taken or detained, especially where distress for rent has been abolished; and as a general thing it altogether supersedes for this purpose the old action of detinue. It will also lie for goods taken in execution, provided the person bringing it against the officer who takes the goods from another by virtue of the execution has a property, general or special, in them, and a right to reduce them into his actual possession; but no replevin will lie in favor of the defendant in execution or attachment, to recover possession of goods seized under such execution, unless they are exempted by law from being so taken.

REPTILES (Lat. *repto*, to creep), a class of vertebrated animals intermediate between fishes and birds. Linnæus united the oviparous quadrupeds and the serpents of Aristotle under the erroneous name of *amphibia*; until within a few years reptiles included batrachians, serpents, lizards, and tortoises, but now the first are regarded as a distinct class by the best naturalists. As thus limited, reptiles do not undergo metamorphosis; are always air breathers, though cold-blooded; have neither mammae, hair, nor feathers; by the two former distinguished from fishes and batrachians, and by the latter from mammals and birds. Although they breathe air by lungs like birds and mammals, the pulmonary circulation is incomplete, only a part of the blood being sent to them, and, from the communication of the ventricles of the heart or the great vessels, a mixed arterial and venous blood, principally the latter, is sent to the organs. Reptiles have been divided into chelonians or tortoises, saurians or lizards, and ophidians or serpents, whose characters are given under their respective orders, families, and popular names. The various systems of classification will be found under HERPETOLOGY; the batrachians have been treated under AMPHIBIA, and the anatomical peculiarities of the order under COMPARATIVE ANATOMY. The number of species of reptiles is about 2,000, or less than that of mammals or birds; most of them are terrestrial, but some (as the dragons) can sustain themselves in the air like the flying squirrels, and the extinct pterodactyl probably winged its way over the water like the bats; some live habitually in the water, swimming by means of flattened fins (as the turtles), or by a laterally compressed tail (as in crocodilians); the amphibœna and other ophisaurians dwell in subterranean burrows. They present every degree of speed, from the agility of the lizard to the slowness of the tortoise; some are fitted for running over dry sand, others for climbing trees, others for ascending smooth surfaces; the limbs are not generally adapted for rapid or graceful motions, being short, almost at right angles with the spine, and hardly raising the body during locomotion sufficient to prevent the ventral surface from dragging on the ground; the anterior limbs are the shortest, and the knees and elbows are constantly flexed and far apart longitudinally; the feet are not adapted for prehension (the chameleon excepted), so that they display little skill in preparing retreats for themselves or places for their eggs. They are naturally cold-blooded for reasons given below, and yet are found in greatest abundance and of largest size in warm climates; under the influence of cold they pass into a lethargic state, and according to Humboldt a similar condition befalls the South American crocodilians during the hottest season of the equatorial regions. Though the very aspect of most reptiles is a great safeguard for them, they have other effectual means of defence; the tortoise and the crocodile are sufficiently protected

against ordinary enemies; the nimble lizard darts into its hole, perhaps at the expense of a part of its tail, which is soon reproduced; the great boas can prevail over every foe but man; many serpents are armed with poisonous fangs, rarely used however except on the defensive; some are covered with bristling spines, like the horned lizards, and are thus saved from predaceous animals. They are of great use to man in destroying noxious insects and other animals; some, like the chelonians, furnish a wholesome and abundant food, and others supply various articles useful in the arts. They are preyed upon by carnivorous birds, as eagles, storks, cranes, and the ibis, and by such mammals as the ichneumon, hog, and the smaller carnivora; they are themselves essentially carnivorous, and feed on living prey which they swallow whole, but the marine turtles are principally herbivorous.—The osteology of reptiles has been given sufficiently in the various articles above referred to. Except in chelonians, the form is generally elongated, more or less cylindrical, with a very long tail; the feet are absent in serpents and in some saurians, and 4 in the others; the skeleton is always osseous, the cranium small, and the facial bones and jaws greatly developed, the latter usually armed with sharp, hooked teeth; the toes are freely movable, and usually with strong claws, webbed in the crocodiles and turtles. The body is covered with scales, generally appendages of the true skin; the overlying epidermis is cast off periodically; these are converted into bony plates in the chelonians and crocodiles, and in lizards and serpents are often brilliant with metallic reflections; in the chameleon, anolis, &c., the surface modifications of the skin present very rapid changes of color, sometimes expressing the anger or fear of the animal, and in some cases enabling them to avoid detection by their enemies. The muscles of reptiles are red, though paler than in mammals and birds; they preserve their irritability for a long time after the death of the animal, in chelonians even after many days; tortoises have been known to live for 18 days after the removal of the brain, groping blindly about. The brain is small, with cerebrum, cerebellum, and medulla oblongata; they have also a spinal system of nerves, and a sympathetic or ganglionic chain; in most the spinal marrow is relatively much more developed than the brain, the latter being smooth, without convolutions, the cerebral lobes being the largest; the cerebral hemispheres contain lateral ventricles, and are larger than the optic lobes, which in fishes constitute the greater part of the brain; there is no *pons Varolii*, and the cerebellum is more developed than in fishes. Life seems in a remarkable degree independent of the brain, the class rather vegetating than living, and being comparatively insensible to pain; they grow slowly and live long, and are exceedingly tenacious of life; the intelligence is hardly greater than in fishes. The sense of touch is dull, both

active and passive, and whether exercised by the skin, toes, lips, tongue, or tail; taste must also be dull, as the food is swallowed without mastication, and the sense of smell must be still less. The organ of hearing is less developed than in birds and mammals; there is no external ear; the tympanum where it exists is bare and almost external, and the internal ear is less developed than in fishes. The eyes are usually small, occasionally absent, flat, with incomplete bony orbits, with lids (except in serpents), and with lachrymal glands. The nasal cavities are of large size, and always communicate with the mouth, and in the crocodiles very far back. The lungs are sometimes of large size, extending even through the whole length of the ventral cavity, which has no diaphragm; in the long-bodied snakes only one lung is active, the other being very rudimentary or absent; these organs are comparatively free, the trachea not divided into bronchi, and the air cells few, of large size, and freely communicating with each other; in lizards and serpents the ribs serve for respiration, and in tortoises the scapular arch performs the office of ribs, according to Van der Hoeven, respiration not being effected by deglutition. Only a small portion of the blood is sent to the lungs, and this is feebly oxygenated, as the respiration is performed slowly and the lung is of loose texture and small capacity; hence a low degree of animal heat, languid movements, and a slow performance of the nutritive functions. They have no true epiglottis and no proper voice, though some emit a hissing sound (as the chelonians) formed in the mouth. The heart has 4 cavities, but the ventricles communicate, except in the crocodilians, where an admixture of the arterial and venous bloods takes place in the great vessels; there is, therefore, a partial circulation independent of respiration, enabling them to remain long under water and in irrespirable gases. The lymphatic system is greatly developed, having regular pulsating organs or lymphatic hearts for the propulsion of their fluid. Reptiles eat and drink comparatively little, and are able to go a long time without food; not having movable and fleshy lips, they cannot perform the act of suction, as was once popularly believed of serpents; the mouth is generally large, and the lower jaw articulated by a distinct bone, the homologue of the *os quadratum* of birds. The tongue is generally free, and the œsophagus very wide and distensible to accommodate a large-sized prey; the intestine is short and straight in proportion to the carnivorous disposition, being longest in the herbivorous chelonians and shortest in the snakes; there is a certain division into small and large intestine, though the latter in most is properly the rectum; the alimentary canal opens below into a cloaca, or cavity common to the digestive, urinary, and reproductive organs, as in birds; all the nutritive elements are extracted from the food, the indigestible matters being

ejected in a mass at long intervals; the vent is transverse in snakes and lizards, but longitudinal in chelonians and crocodiles, corresponding to remarkable differences in the male external reproductive organs, these in the former being double and placed in a cavity behind the anus, and in the latter single and within the cloaca. Salivary glands, which are absent in fishes and batrachians, are present in reptiles; the liver is always present, of large size, receiving much venous blood, especially that from the posterior part of the body, and exercises the usual functions of the organ; the gall bladder is commonly found, though of small size; the spleen is generally very small, removed from the liver and stomach, rounded, and deep red; the pancreas is constant, often large at the beginning of the intestine, and of various forms; the kidneys are situated along the spine, showing no distinction of cortical and medullary portions; the ureters open into the cloaca, and the urine is a whitish mass, more or less hard, containing salts of lime and ammonia; the supra-renal capsules are usually present, small, and often remote from the kidneys; there are one posterior and two anterior venæ cavae. The power of reproducing parts lost by accident or design is less than in batrachians, and is noticed especially in the tails of certain lizards and serpents. There is in this class no durable union of the sexes as in birds and mammals, and nothing which exerts any influence on the social condition of the individuals; after the instinctive act of reproduction they separate and become perfect strangers. Most are oviparous, leaving their eggs to be hatched by the heat of the sun, and the young when born are able to provide for themselves and generally indifferent to the mother, which has neither the joys nor the sorrows of maternity; the female rarely makes a nest, but deposits her eggs in a safe, warm, and dry place; crocodiles and some lizards watch in the neighborhood of the place where their eggs are concealed, and the python has been seen in menageries coiling herself around her eggs in a conical form, closing the top with her head. Some of the serpents are viviparous, the young being so far developed before the exclusion of the eggs as to be born alive; in the viviparous snakes the young are said to take refuge within the mouth of the mother. The eggs have generally a more or less calcareous shell, globular or rounded equally at each end; in serpents they are often joined together in chaplets; their number varies from 20 to 100. The embryo is completely enveloped by the amnios, and after it has attained a considerable degree of development a second membranous covering appears, for the first time in vertebrates, the allantois, richly supplied with vessels and enclosing embryo and amnios.—As reptiles are generally despised and hated by man, and comparatively little under his influence, their original geographical distribution has been but slightly changed by him. Most of the serpents, especially the venomous kinds, belong to warm

regions, the rattlesnakes to America and the cobras to the old world; the pythons are natives of the eastern hemisphere, and most of the boas of South America; most lizards also belong to tropical countries, the chameleon and agamas to Africa, the flying dragons and gavial to Asia, and the alligators to America; and the class is met with in swamps and marshes, dry and desert places, forests, mountain regions, the sea shore, and river, lake, and ocean.—Reptiles are very interesting palæontologically on account of the strangeness of their forms, gigantic size, and geographical distribution, embracing the great megalosaurus, iguanodon, and colossochelys, and the anomalous ichthyosaurus, plesiosaurus, and pterodactyl. The secondary geological epoch, comprising the carboniferous (according to some authorities), the trias, oolite, and chalk, has been called the age of reptiles; during this period air-breathing animals first appeared, and reptilian forms predominated, some of whose impressions have been left in the sandstone of the Connecticut valley. The gigantic and uncouth forms of the secondary age had disappeared in the tertiary, and the reptiles of the latter were more like the present ones, except in geographical distribution, and were in about the same proportion to the rest of creation as now. The study of fossil reptiles shows the limited duration of species; before the diluvial epoch there is not a single reptile that can be referred to living species and hardly to an existing genus; the reptiles of each age, triassic, jurassic, and cretaceous, have a special facies, unlike any which preceded or followed them; the difference between the fossil and living forms is always greater as we go back in time. This study also proves that the temperature of the earth has varied, as the great reptiles above named lived in parts of Europe nearer the frigid than the torrid zone. All the fossil forms, however odd, were constructed on the same reptilian vertebrate type as at present, in some instances with ornithic (pterodactyl) or mammalian affinities (ichthyosaurus). In the most ancient fauna of reptiles, chelonians and saurians, the highest in the class, are represented, and some forms then existing were in certain respects more perfect, or at any rate more complex, than some present members of the class; each fauna had its type of perfection, without regard to the superiority or inferiority of that which preceded or followed it; we find no transition species leading to or from ichthyosaurus, plesiosaurus, pterodactyl, and the like, unless we ascend to cetacean mammals in the first and to bats in the last. Reptiles (including batrachians even) are very rare, and to some questionable, in the devonian; there are a few amphibians in the carboniferous; the class abounds in the divisions of the trias, and is most numerous in the jurassic, becoming less abundant in the oolite and chalk. For details on fossil reptiles see the various articles on the genera above mentioned.



REPTON, HUMPHRY, an English landscape gardener, born in Bury St. Edmund's, May 2, 1752, died March 24, 1818. At the age of 16 he entered the counting house of a Norwich merchant, and subsequently set up business for himself, but failed. Some years afterward he adopted the profession of landscape gardening, and was henceforth uninterruptedly prosperous. At the period of his death there was scarcely a county in England which did not have some "places" adorned by his skill. His reputation was also largely increased by his works on landscape gardening, which, with an account of the author's life, were reprinted by J. C. Loudon (8vo., 1840).

REPUBLIC (Lat. *respublica*, from *res*, a thing, and *publicus*, pertaining to the people), a form of government in which the supreme power belongs to the people or to a portion of them, and not to a single person or family, as in a monarchy. A republic may thus be either aristocratic or democratic. The free states of the American Union are the most perfect examples of the latter kind, and the extinct republics of Sparta, Venice, and Genoa of the former. In modern times it is frequently very difficult to perceive any great practical difference between avowed republics and many governments that bear the name of monarchies. Great Britain, for example, is really an aristocratic republic, in which the actual power is exercised by the well-born, wealthy, and educated classes, though the forms and style of a monarchy are still preserved.

REQUIEM (accusative of Lat. *requies*, rest,) in the Roman Catholic church, a mass performed for the repose of the dead, so called from the prayer commencing: *Requiem eternam dona eis Domine*. Certain solemn musical compositions, written for a full choir of voices and performed on such occasions, are also called requiems. Well known examples of these are the requiems of Mozart, Jomelli, and Cherubini.

REQUIER, ARGUSTUS JULIAN, an American poet, lawyer, and politician, born in Charleston, S. C., May 29, 1825. His father was a native of Marseilles; his mother the daughter of a Haytian lady, who fled to the United States with a few faithful slaves upon the outbreak of the servile revolution in that island. In 1844 he commenced the practice of law, and in Oct. 1850, removed to Mobile, Ala.; and on the accession of Mr. Pierce to the presidency of the United States, in 1853, he was appointed district attorney for the southern district of Alabama. He was reappointed by Mr. Buchanan; resigned the office on the secession of Alabama, in Jan. 1861; and again received the same appointment from the government of the Confederate States, a few months afterward. Early a writer for the press, in 1842 "The Spanish Exile," a play in 3 acts from his pen, was successfully performed in Charleston and other places, and soon afterward published. "The Old Sanctuary," a romance, the scene of which was laid in Charleston at a period an-

terior to the American revolution, was published in Boston in 1846, and favorably received. Many minor poems appeared in various magazines between 1845 and 1850. In 1860 a collected edition of his poems was published in Philadelphia; and "Marco Bozzaris," a play written 14 years before, was produced at the Mobile theatre, with much success, soon after its publication in this volume.

RESACA DE LA PALMA, a ravine, as its name imports, thickly grown with palm trees, that crosses the Matamoras road, in Texas, about 3 m. from the place where the road opens upon the Rio Grande opposite the town of Matamoras. This ravine is memorable as the field of a battle fought May 9, 1846, between 2,000 U. S. troops under Gen. Zachary Taylor and the Mexican army under Gen. Arista, 6,000 strong, which resulted in the defeat of the latter.

RESHID PASHA, MUSTAPHA, a Turkish statesman, born in Constantinople in 1802, died there, Jan. 2, 1858. His parents died when he was still a boy, and he was educated by Ali Pasha, who had married his sister, and was governor of a province in Asia Minor. In 1822 Ali became grand vizier, and soon after the breaking out of the Greek revolution was sent to the Morea to suppress the insurrection. Reshid accompanied him in the campaign, and on his death attached himself to Selim Pasha, whom he served as private secretary in the campaign against the Russians in 1828-'9. He took part in the negotiation of the treaty of Adrianople, and was shortly afterward sent on a diplomatic mission to Mehemet Ali, pasha of Egypt. In 1833 he assisted in negotiating the treaty of Kutaieh, which restored peace between the sultan and his rebellious Egyptian vassal. For this service he was raised to the rank of pasha, and in 1834 was sent as special envoy to Paris and London, in which capitals he resided alternately about two years, studying the society and the institutions of western Europe. Soon after his return to Constantinople he was made grand vizier. In this post he undertook a variety of important reforms, which aroused so much opposition among the bigoted part of the population that the sultan was compelled to dismiss him from the premiership and send him again as ambassador to Paris. On the death of Sultan Mahmoud in 1839 he returned to Constantinople, and was placed by Sultan Abdul Medjid at the head of the cabinet with the title of minister of foreign affairs. His influence led to the promulgation, in 1839, of the *hatti sherif* of Gulhana, followed afterward by the great and comprehensive edict of reform known as the *Tanzimat*, by which enactments the pashas were deprived of their despotic power over the provinces, the Christians raised to a civil equality with the Mussulmans, and the whole administrative system of the empire vastly improved. From that period till his death Reshid Pasha occupied with brief intervals the most important posts of the Turkish govern-

ment. In 1841 he was again sent envoy to England. His influence was always exerted for the maintenance of peace, and his chief fault as a statesman is alleged to have been mildness and good nature. He was "the husband of one wife," and discountenanced polygamy. He possessed uncommon accomplishments for a Turk, being well versed in several European languages and in general history and science.

**RESIDENCE.** See **DOMICILE**.

**RESINS**, a class of proximate principles existing in almost all plants, and appearing upon the external surface of many of them in the form of exudations, which become hard on exposure by the evaporation in part of the volatile matters or essential oil which holds the resins in solution, and in part by the oxidation of this oil. When these principles do not exude spontaneously, they may in many plants be made to appear by puncturing the bark, and thus opening a passage for the discharge of the fluid; or if this fail, the resinous principles may be extracted by boiling the sawdust of the wood with alcohol. The resins are precipitated by the addition of water, and as the alcohol is distilled off the particles collect and agglomerate together. Resins are so variously composed of numerous principles, that no little diversity is observed in their general properties, and they are therefore arranged by different authorities under several heads. The presence of benzoic or cinnamic acid, or of substances which may produce either of these, is made by the French a base for one division known as balsams; and the presence of matters soluble in water of the nature of gum for another division called gum resins. (See **BALSAMS**, and **GUM RESINS**.) Other divisions are formed: 1, of those resins which, when distilled with water, yield a volatile oil, and leave one or several resins possessed of acid properties, including the several turpentine resins; 2, those which in addition to the above products also yield a neutral resin, which generally is capable of crystallizing, such as animi, elemi, mastic, palm wax, &c.; and 3, those which yield no volatile oil by this treatment, as amber, copal, lac, betulin, &c. In general the resins are solid bodies of vitreous fracture, brittle, so as to be readily pulverized when cold, usually transparent or translucent, rarely colorless, but either brown, red, or green. Their specific gravity is from 0.92 to 1.2. They occasionally have a decided taste or odor, derived from some essential oil or other foreign substance present; and to the same cause is probably owing the occurrence of some of the resins in a soft state. The solid resins are non-conductors of electricity; and by friction they assume the electric state known as negative or resinous. They melt at a moderate heat, and form a thick viscid liquid; on cooling this becomes a shining solid mass of vitreous fracture, which occasionally, when scratched with a sharp point after sudden cooling, flies off into pieces like Prince Rupert's drops. They readily

take fire, and burn with a white or yellow flame and much sooty smoke. They are soluble in ether, the volatile oils, and in boiling alcohol; the alcoholic solutions of some of them possess acid properties. These acid resins combine with the alkalies and form leys, which when agitated produce a lather like that of soap, differing from it, however, in not being precipitated or becoming hard on addition of common salt. Many of the natural resins are mixtures of two or more resins, which may often be separated from each other through their different solvents. When decomposed at a high heat in close vessels, the resins are resolved into carbonic acid, different gaseous hydrocarbons, empyreumatic oil, a little acidulous water, and a very little shining charcoal. Those of most importance are separately described in this work under their own names.—One very useful variety, known as common or yellow resin or rosin, is the residue after the distillation of the volatile oil from the turpentine of different species of pines, and is rather an incidental product of the preparation of the oil of turpentine, which, though amounting to only 10 to 25 per cent. of the turpentine (and the rosin constituting the large remainder), is by far the most valuable product. The manufacture is largely carried on in North Carolina, and to less extent in other southern states, and will be more particularly noticed in the article **TURPENTINE**. The rosin while still liquid is drawn off into metallic receivers coated with whitening to prevent adhesion, and from these it is transferred to the casks for shipment. When the distillation is stopped at the proper point the product is the yellow rosin, which contains a little water; or this may be expelled, and the product is then transparent rosin. By continuing the heat the residue in the stills becomes darker till it is of a brown or black color, a variety which in Europe is sometimes known as colophony. Rosin melts at 276° F., and becomes completely liquid at 306°; at 316° it emits bubbles of gas, and at a red heat it is entirely decomposed. Its ultimate composition, according to Laurent, is expressed by the formula  $\text{HO}, \text{C}_{20}\text{H}_{22}\text{O}_2$ . Its proximate ingredients were found by Unverdorben to be two isomeric resinous acids, which he designated sylvic and pinic acids; and from the latter when heated to partial decomposition he obtained a third, which he called colophonic acid. These are distinguished from each other by their different degrees of solubility in alcohol. The last, beside being least soluble, has moreover stronger acid properties. A variety of hydrocarbons are obtained from common rosin as follows: terebenc,  $\text{C}_{20}\text{H}_{18}$ , boiling point 320°; colophene,  $\text{C}_{10}\text{H}_{12}$ , b. p. 599°; resinine,  $\text{C}_{10}\text{H}_{12}\text{O}_2$ , b. p. 482°; retinaphtha, or toluole,  $\text{C}_{11}\text{H}_8$ , b. p. 226°; retinyle or cumole,  $\text{C}_{11}\text{H}_{12}$ , b. p. 302°; retinole,  $\text{C}_{22}\text{H}_{16}$ , b. p. 460°; naphthaline,  $\text{C}_{20}\text{H}_{16}$ , b. p. 428°; metanaphthaline,  $\text{C}_{10}\text{H}_8$ , b. p. 617°.—Rosin is employed for a variety of useful purposes. It is an ingredient in varnishes, and is

united with tallow in the preparation of cheap candles. It answers to some extent as a substitute for fixed oil or fat in the manufacture of yellow soap, but, without glycerine in its composition, it possesses no true saponifying properties. (See SOAP.) Rosin is also used in perfumery, and in various pharmaceutical preparations, as plasters and ointments. In caulking the seams of ships it is used in a melted state to fill them, and by oakum makers it is intermixed in a pulverized state with the oakum to increase its weight. It enters into the composition of some fireworks. It is a rich source of gaseous hydrocarbons, and is sometimes used to furnish these for illuminating purposes. The oil extracted from it, and known as rosin oil, is however preferred for this purpose. (See GAS.) It is a product of the destructive distillation of rosin, which separates by this process into oil and tar. The oil is a mixture of the 4 hydrocarbons, retinaphtha, retinyle, retinole, and metanaphthaline. That portion which comes over at a temperature of about 300° F. is sometimes used as a substitute for oil of turpentine. Retinole, which is obtained at 460°, enters into the composition of some printing inks.—Many attempts have been made to bleach the common sorts of rosin, which if successful would add materially to their value. This is said to have been recently accomplished by the process of Messrs. Hunt and Pochin, which consists in distilling the rosin at a temperature below that by which it would be decomposed, and this is effected by melting it in a suitable vessel, and passing steam through the fluid mass until all or nearly all the rosin has been carried over; the maximum temperature allowed is about 600°. The rosin and steam are collected and condensed in a suitable receiver kept as cold as possible by the application of water, and free from the moisture of the condensed steam. Instead of steam, carbonic acid, or a mixture of carbonic acid and nitrogen, or hydrogen gas, &c., are introduced to decolor the rosin. The product is white and almost transparent, and is greatly preferred to the crude article by soap and varnish makers, who are willing to pay three times the usual price for it. The United States supplies the chief portion of the rosin of commerce. Out of 701,430 cwt., worth £314,715, imported into Great Britain in 1858, 682,452 cwt., worth £306,175, was from this country.

**RESPIRATION**, the function of vegetative life performed by lungs, gills, tracheæ, or the general cutaneous surface, singly or combined, and by which the carbonic acid resulting from the continual disintegration of the living tissues is removed from the blood, and its place supplied by oxygen from the respired air by a chemico-physical reaction. As the production of carbonic acid from the waste of the tissues is more rapid in warm-blooded than in cold-blooded animals, the former have a more active respiration, and suffer much the soonest from the deprivation of air. (See HIBERNATION, and NUTRITION.) So important is this function

in the higher animals, that the right half of the heart is appropriated to it, sending all its blood to the lungs, in the delicate air cells of which the requisite change is effected. All organized beings, vegetable as well as animal, demand this change in proportion to the number and energy of their vital actions. The green parts of plants in the sun take in carbon and liberate oxygen, but at night exhale carbonic acid; the roots, flowers, and germinating seeds, as well as fungi, absorb oxygen and give out carbonic acid; the leaves are the principal respiratory organs of ordinary plants. Fresh water contains about  $\frac{1}{3}$  of its volume of air, of about 32 per cent. oxygen, 68 nitrogen, and 2 to 4 carbonic acid; sea water contains rather less oxygen and more carbonic acid. In the lowest animals respiration is effected by the external surface, there being neither gills, heart, nor vessels; in aquatic invertebrates and in fishes gills are the organs; in insects and spiders, tracheæ; in many terrestrial invertebrates, in reptiles, birds, and mammals, these organs are called lungs; the air bladder of fishes is a rudimentary lung, and the intestinal mucous membrane in some performs respiratory functions (as in the loach); the perennibranchiate batrachians breathe by gills, lungs, and by the skin. The water for respiratory purposes may be introduced by the action of cilia, as in mollusks; by appendages to the locomotive system and the jaws, as in crustaceans; by the contractions of the mantle, as in cephalopods; by the abdominal contractions in insects; and by the branchial apparatus in fishes. The mechanism of respiration by means of lungs has been noticed when treating of those organs, and under BIRDS, MAMMALIA, and REPTILES. Atmospheric air contains in 100 volumes on an average 79 of nitrogen and 21 of oxygen, and also more or less watery vapor and a small proportion of carbonic acid. The introduction of oxygen supplies a necessary stimulus for the active exercise of the muscular and nervous systems, and in proportion to the amount of their action; for efficient performance a continual supply of fresh air to the lungs and of blood to their capillaries is necessary; on the union of carbon with oxygen, by a process of slow combustion, principally depends the amount of animal heat. The muscular movements of respiration are essentially involuntary, and are usually performed without the consciousness of the individual; they are, however, to a certain extent under the influence of the will, and may be interrupted for a short time without inconvenience, as in the ordinary exercise of speech. Though the lungs may have no vital contractility, their elasticity when distended is considerable, and is exerted in aid of the expiratory movement, though this antagonism is easily overcome during inspiration by the action of the thoracic respiratory muscles; as the lungs in health fill the cavity of the pleura, when the chest is enlarged the air rushes in to distend the air cells and to fill the

vacuum that would otherwise be produced; if an opening be made into the pleural cavity, the expansion of the lung of that side is diminished or prevented in proportion to the size of the aperture. The enlargement of the pleural cavity during inspiration is effected chiefly by the diaphragm, which from a high arch becomes plane, pressing on the organs below and protruding the abdominal walls, and this is alone nearly sufficient for tranquil breathing; when greater dilatation is required, the ribs are elevated and the sternum pushed forward; in man this change is greatest at the lower part of the chest, hence his respiration is called inferior costal, and in woman at the upper part, her respiration being accordingly styled superior costal. Other inspiratory muscles are the external intercostals and *levator costarum*; the expiratory muscles are the central portion of the internal intercostals and the abdominal layers; in labored inspiration all the muscles which raise the shoulder blade and ribs and hold the spine erect are called into play, and in expiration the long muscles of the back and the depressors of the ribs; in urgent dyspnoea almost every muscle may become a fixed point for the accessory distention of the chest. The force of the expiratory muscles is about  $\frac{1}{2}$  greater than that of the inspiratory. To facilitate the respiratory function the pulmonary circulation is simple, the vessels not arranged in networks, the capillaries uniformly distributed over the air cells and intercellular passages, and the veins with very imperfect or no valves; the course of the blood is not affected by changes of atmospheric or muscular pressure; it remains venous till it reaches the capillaries, where it becomes arterial by parting with carbonic acid and receiving oxygen. The differences between arterial and venous blood, as to the proportions of oxygen and carbonic acid, effected by the respiratory process, indicate that an exchange of oxygen for carbonic acid takes place in the systemic circulation, and of carbonic acid for oxygen in the general circulation. Fibrine is increased during aëration, and the dark color of venous blood is changed to bright arterial, whether the cause be a chemical or physical change (contraction) in the red corpuscles. The chief nervous centre of the respiratory movements is the upper part of the medulla oblongata; the principal excitator is the pneumogastric or par vagum nerve, which receives and conveys impressions due to the presence of venous blood in the capillaries and of carbonic acid in the air cells; they are probably partly dependent on a sensation excited in the brain by the circulation of impure blood, on the reflex influence of the nerves of the general system distributed to the surface, especially the 5th nerve in the face, and doubtless also on the branches of the sympathetic system in the lungs and on the small vessels. The motor nerves concerned in this function are the phrenic, arising from the upper part of the spinal cord, the intercostals lower down, and the fa-

dial and spinal accessory from the medulla oblongata, perhaps also connected with other segments of the spinal cord. That the respiratory movements are essentially involuntary, is known from the impossibility of holding the breath in the air, even when with suicidal intent, for more than a few minutes, the *besoin de respirer* or the demand of the system for oxygen being more powerful than the control of the will; that they are also independent of consciousness, we see in sleep, coma, and in anencephalous and decapitated animals. When respiration is suspended, carbonic acid is retained in the blood, and the condition of asphyxia ensues, characterized by cessation of muscular motion and circulation, and the accumulation of blood in the venous system; warm-blooded animals perish sooner from this cause than reptiles, fishes, and invertebrates; hibernating animals support life for months with a very low respiration, and aquatic mammals, birds, and reptiles have special reservoirs in the circulating system which enable them to remain under water without breathing for a considerable time. If respiration be suspended in an active warm-blooded animal, muscular motions will cease in from 3 to 5 minutes and the circulation within 10; by habit pearl divers can remain under water 3 or 4 minutes; in drowned persons vital activity has been restored after a submersion of 15 or 20 minutes and perhaps longer, especially when from fright a state of syncope has come on at the moment of immersion and reduced the circulation to so low an ebb that deprivation of air would not be speedily fatal. In dislocation of the spine between the origins of the intercostal and phrenic nerves, the former being paralyzed, respiration is confined to the diaphragm; this being insufficient, serum is effused and a slow suffocation supervenes; other obstacles to sufficient respiration are solidification of the lung from any cause, and adhesions of the pleuræ. Artificial respiration will frequently restore the circulation in asphyxia from any cause, or excite it in still-born infants. Sighing, sobbing, yawning, laughing, sneezing, crying, and coughing are modifications of the respiratory movements. According to Dr. Hutchinson, the vital capacity of the human lungs, or the volume of air which can be displaced by a single forced expiration, varies from 174 cubic inches in a man 5 feet high to 262 in one of 6 feet, there being a difference of 8 cubic inches for every inch of stature between 5 and 6 feet; this is but slightly modified by weight, age, and muscular vigor. The amount actually exchanged at each ordinary respiration is set down by Carpenter as about 20 cubic inches, which is mingled with the air already in the lungs in virtue of the law of the diffusion of gases, the lungs actively assisting, according to Prof. Draper, by the muscular contractions of the smaller bronchial tubes. The amount of air passing through the lungs in 24 hours of course varies with the extent and frequency of the re-

spiratory movements; 800 cubic feet, from experience, seems to be the minimum that can safely be claimed for a single individual under ordinary systems of ventilation. The oxygen of the air is removed and its place supplied with carbonic acid at an average rate of 4.35 per cent., and this should be supplied by proper ventilation, as a proportion of 5 or 6 per cent. of carbonic acid in the respired air is dangerous to life. The number of the respiratory movements in a healthy adult man, whose pulse is from 65 to 70, varies from 14 to 18 per minute. The reaction between the air and the blood is partly physical, according to the laws of the diffusion of gases through the membranous walls of the air cells. The amount of oxygen absorbed depends much on the nature of the food, being far greater in carnivorous than herbivorous animals; the amount of carbonic acid exhaled in a healthy man in 24 hours has been estimated at 3,840 grains or 8 oz. troy; this is increased by cold, moisture, muscular exertion, plentiful food, and diseases of skin, and is lessened by alcohol, in sleep, and in typhoid diseases; it is greatest in robust adult males, and is stationary in females during menstrual life. Rather more nitrogen is exhaled than is taken into the lungs; watery vapor is also given off during respiration, about 16 to 20 oz. in 24 hours. Respiration by the skin is an important accessory in man. (See PERSPIRATION, and SKIN.) Volatile matters may be absorbed by the lungs during respiration, both for useful and dangerous purposes; the vapor of turpentine thus introduced acts on the urinary secretion; arseniuretted hydrogen from green wall papers may in this way produce dangerous poisoning; miasmata and other morbid agents are most readily introduced through the lungs; active medicines, like mercury, iodine, tobacco, stramonium, and other substances soothing to pulmonary irritation, are most naturally received into the system in the same manner, as also are the remarkable anæsthetic agents sulphuric ether and chloroform.—The importance of the respiration of pure air, both for individuals and communities, need only be alluded to here. The breathing of air charged with the exhalations of the lungs and skin is the most powerful of all the predisposing causes of disease, especially of those wide-spread and fatal epidemics depending on the presence of fermentible and putrescible matters in the blood, as is proved by the history of the cholera. The effluvia of vaults, drains, sewers, extensive piggeries, slaughter houses, manufactories of manure, &c., from bones, and other putrescent emanations, are prolific sources of diseases, almost always with a typhoid tendency. The history of disease proves that purity in the air habitually respired is essential to the maintenance of the full power of resisting morbid influence in man and the domestic animals.

RETORT, a vessel used chiefly for effecting distillations in the laboratory, and in various

forms in manufacturing operations, where the distillation is of the dry or destructive character; but in the wet distillations in the large way the vessels not of glass corresponding to retorts are called stills. The chemist's retort is commonly of glass, and of all capacities up to several gallons. It consists of a rounded body for containing the liquid, the upper portion of which is bent over and drawn out into a long tapering neck about at right angles with the body. The substance to be distilled is introduced through the neck, or in "tubulated" retorts an opening is made at the top and provided with a glass stopple, so that while the distillation is in progress the contents can be replenished through this opening. The vapors as they rise pass through the neck, and thence into the receiver, another vessel connected with the retort. The glass is made thin and of refractory character, so as to bear without risk of fracture, when containing a liquid, either the direct flame of a lamp over which the vessel is placed, or the heat of the sand bath. Retorts are also made of earthenware and of the metals. A convenient iron retort is made by attaching an iron tube for a neck to one of the bottles in which mercury is sold. In the manufacture of illuminating gas, the retorts are of iron or of clay, 6 feet or more in length. (See GAS.) In charring wood for charcoal and pyroligneous acid, cylindrical iron retorts of large size are used, and also brick ovens or kilns, the capacity of which is sometimes equal to 60 cords of wood. Such kilns are properly retorts if used with eduction pipes for conveying the volatile products to a receiver to be condensed.

RETZ, GILLES DE LAVAL, baron, and marshal of France, born about 1396, put to death in 1440. Under Charles VII. he distinguished himself in the war against the English, fought with the maid of Orleans, and finally obtained a marshal's baton. In consequence of pecuniary troubles, he retired to his castle in the neighborhood of Nantes. Rumors of shameful deeds practised by him becoming very rife, the bishop of Nantes summoned him to be tried before a mixed commission. It was proved that during 14 years the baron had enticed into his castle several hundred children of both sexes, had practised magic, and had paid a formal worship to the infernal powers, in which his victims were obliged to take part as priests and priestesses. He was handed over to the civil power, and by a decree of Oct. 25, 1440, he was declared guilty of apostasy, of heresy, of the invocation of demons, of unnatural practices, and of sacrilege, and was condemned to the stake, but out of consideration for his dignity was strangled.

RETZ, JEAN FRANÇOIS PAUL DE GONDI, cardinal de, a French politician and historical writer, born in Montmirail in 1614, died in Paris, Aug. 24, 1679. A younger son of Philippe Emmanuel de Gondi, the general of the galleys under the reign of Louis XIII., he was from his infancy destined for the church, with



a view to the archbishopric of Paris, then held by his uncle, and previously by his grand-uncle. He endeavored to avoid this destination of himself, and entered a career of intrigue and licentiousness; love affairs and duels, high living and scandalous frolics, and active participation in every conspiracy plotted against Richelieu, were all employed as means for establishing a reputation that would unfit him for the church; but his family proved immovable in their decision. The profligate abbé, convinced that all his exertions would be of no avail, turned his attention to theological studies, and, without losing in the least his taste for political intrigue, acquired proficiency as a divine and a preacher. He took a high rank among the most distinguished members of the church, and in 1643, when not yet 30 years old, became coadjutor to his uncle the archbishop, Henri de Gondî. His winning manners, eloquence, zeal for the welfare of his flock, abundant alms, and seeming Christian virtues secured for him unparalleled popularity among the Parisians. When the troubles of the Fronde broke out, he offered his services to the regent, Anne of Austria; but being coldly received, he used his popularity to cause the people of the metropolis to rise in arms against Mazarin, and became in effect the leader of the revolt. During the 5 years of that strange civil war, he evinced extraordinary talents; but he played with his allies as well as his opponents, won a cardinal's hat in 1651 through his temporary alliance with the court, and finally lost credit with all parties. Previous to the termination of the troubles, he was arrested by order of the queen, the Parisians not making the slightest attempt to rescue him. He was first taken to Vincennes, then to the castle of Nantes, whence he escaped. He took refuge in Spain, then in Italy, where his rank as a cardinal and his dignity of archbishop of Paris, in which he had in 1654 succeeded his uncle, secured him some respect. His return to France was finally permitted in 1661, but on condition of resigning his archbishopric, which he exchanged for the abbacy of St. Denis, the richest preferment in France. He now gave up politics entirely, lived for the most part on an estate of his in Lorraine, paid up his old debts, which amounted to more than 3,000,000 livres, and to his last day was admired for his liberality and kindness. Mme. de Sévigné, who was among the most intimate of his friends, used to call him in her letters "our good cardinal." He had, when scarcely 17 years old, written a history of the conspiracy of Fieschi, the perusal of which elicited from Cardinal Richelieu the characteristic remark: "This will be a dangerous mind." The leisure hours of his retired life were devoted to writing his personal memoirs, which were printed for the first time in 1717 (3 vols. 12mo., Nancy), and have been often reprinted, with the addition of those of Guy-Joly and the duchess de Nemours, by which they are completed.

They are included in Petitot's and Michaud and Poujoulat's *Collections de mémoires sur l'histoire de France*. The most recent and accurate edition is that of Aimé-Champollion (4 vols. 12mo., 1859), with annotations and index.

RETZSCH, FRIEDRICH AUGUST MORITZ, a German painter and designer, born in Dresden, Dec. 9, 1779, died near that city, June 11, 1857. He studied in the Dresden academy, and for several years painted portraits and historical and imaginative subjects. In 1824 he was appointed professor of painting in the academy. As a painter he is little known, and his reputation rests upon his outline etchings and designs illustrating "Faust" and the romantic ballads of Goethe, Schiller, Bürger, and other German poets, and several of the plays of Shakespeare. In addition to these works may be mentioned his numerous *Phantasien* and "Sketches," produced with almost incredible facility, and his "Goblet" and "Chess Players," &c.

REUCHLIN, JOHANN, called also KAPNIO (Gr. *καπνιον*, diminutive of *καπνος*, smoke, a translation of Reuchlin), a German scholar, born in Pforzheim, Dec. 28, 1455, died in Stuttgart, June 30, 1522. He studied at the school of Schlettstadt, and on account of the sweetness of his voice was admitted into the chapel of the margrave of Baden, where he attracted the attention of that prince, who selected him to accompany his son Frederic in 1473 to the university of Paris. There he found opportunity to study Hebrew and Greek, gaining the means to support himself and to purchase books by copying the poems of Homer and the orations of Isocrates. At the age of 20 he taught at Basel philosophy and Greek and Latin; studied law in Orleans, and returning to Germany was in 1481 made teacher of jurisprudence and belles-lettres in the university of Tübingen. In 1483 he accompanied his patron, Eberhard of Württemberg, to Italy, where he came in contact with some of the most learned men of that country, who were astonished at the elegance of his scholarship. He then settled at Stuttgart, received from the emperor Frederic III. the titles of count palatine and imperial councillor, and was employed for several years in various legal and diplomatic functions. After the death of Eberhard he went to the court of the elector Philip at Heidelberg, and there remained many years, during which he made valuable additions to the Heidelberg library; and when the elector in consequence of calumnious reports fell under the ban of the papal court, Reuchlin went to Rome and by his address obtained the absolution of his patron. For 11 years he filled the post of president of the Swabian confederate tribunal, but nevertheless found time to devote himself to his literary occupations, especially to the study of the eastern tongues, and was constantly collecting Greek and Hebrew manuscripts. In 1509 Reuchlin became involved in that famous controversy with the monks which immediately preceded

the reformation. A converted Jew named Pfefferkorn persuaded the inquisition of Cologne to solicit from the emperor Maximilian an order that all Hebrew books with the exception of the Bible should be burned, on the ground that they were full of blasphemies against Jesus Christ. The emperor asked the opinion of Reuchlin, who had lately been turning his attention to cabalistic studies, and he remonstrated strenuously against the wholesale destruction of so many curious and valuable works, although he left those directed against Christianity to their fate. The order was therefore superseded. The inquisitors raised a furious cry against Reuchlin, picking out passages from his works and perverting their meaning, and charging him with being a heretic and being secretly inclined to Judaism. Reuchlin, who was at first alarmed, soon took up arms, and in 1518 published a "Defence against his Cologne Slanderers;" and in revenge the inquisitor Hoogstraaten formed a tribunal at Mentz, by the order of which the writings of the German scholar were committed to the flames. The friends of classical literature were indignant at this proceeding, and the struggle soon became general. An appeal was made to Pope Leo X., who referred the whole matter to the bishop of Spire, and that prelate declared Reuchlin innocent, and ordered the monks to pay the expenses of the investigation. Still the Dominicans persisted, and the matter was again brought before Leo, who issued a mandate to suspend the proceedings against Reuchlin. The opening of the reformation prevented the matter from being ever brought up again; but the victory resulted really if not nominally in favor of the advocates of classical literature, the study of Greek and Hebrew from that time becoming general among the Germans. (See *EPISTOLÆ OSCURORUM VIRORE*.) In the stormy times which followed, Reuchlin had his full share of trouble. When in 1517 he received the theses propounded by Luther, he exclaimed: "Thanks be to God, at last they have found a man who will give them so much to do, that they will be compelled to let my old age end in peace." In the war between Franz von Sickingen and Ulric, duke of Württemberg, Reuchlin was obliged to leave Stuttgart, and in 1520 was made professor in the university of Ingolstadt by Duke William of Bavaria. He received an invitation to go to Wittenberg, and recommended in his place his cousin Melancthon. When in 1522 the plague broke out in Ingolstadt, he retired to Tübingen with the intention of devoting himself wholly to his studies, but soon sickened and died. The labors of Reuchlin in behalf of the revival of classical literature in Europe were arduous and extremely important. Among his philological works may be mentioned an edition of Xenophon's "Apology of Socrates, Agesilaus, and Hiero" (Hagenau, 1520); several Latin translations of Greek authors; *Micropedia, sive Grammatica Græca* (Orleans, 1478); *Breviloquus,*

*sive Dictionarium singulas Voces Latinas breviter Explicans* (Basel, 1478); *Rudimenta Hebraica* (Pforzheim, 1506); and *De Accentibus et Orthographia Hebræorum Libri III.* His edition of the 7 penitential psalms (Tübingen, 1512) is thought to have been the first Hebrew work printed in Germany. His library was for the age in which he lived remarkably large, and he himself was regarded with extraordinary affection by the literary men of his time. Although suspected of a leaning toward Protestantism, he never renounced his connection with the Roman Catholic church.

REUS, a town of Catalonia, Spain, in the province of Tarragona, 255 m. N. E. from Madrid; pop. 28,084. It stands in a fertile plain at the foot of a chain of hills about 4 m. from the Mediterranean, and had at one time strong fortifications. Linen, silk, and cotton are manufactured. Reus is connected by a canal with Salou, and by railroad with Tarragona.

REUSS, a territory of central Germany, between lat. 50° and 51° N., and long. 11° and 13° E., enclosed by Meiningen, Prussian Saxony, Weimar, Altenburg, the kingdom of Saxony, and Bavaria; area, 463 sq. m.; pop. 121,203. It consists of two unequal portions, separated by the southern part of Weimar. It is a part of what was formerly known as Voigtland, mostly hilly, and traversed by the upper courses of the White Elster and Saale. The climate is healthy and agreeable. Cattle and sheep rearing, and the weaving of linen, woollen, and cotton fabrics, are the chief occupations of the inhabitants, almost all of whom are Lutherans. The territory forms now two sovereign principalities of the Germanic confederation, Reuss-Greiz (or Greiz) and Reuss-Schleitz (or Schleiz). The former division (area, 144 sq. m.) is the patrimony of the elder branch of the reigning family; its capital is Greiz, on the Elster. The latter (area, 319 sq. m.), which is ruled by the younger line, comprises the principalities of Schleitz, Lobenstein-Ebersdorf, and Gera, the capital being Schleitz. Both together furnish a battalion of infantry as a contingent to the federal army. The respective reigning princes are Henry XXII. and Henry LXVII., descendants of Henry of Gleisberg, voigt of Weida and marshal of the court to the emperor Frederic I.

REUSS, a river of Switzerland. See Uri.

REUTERDAHL, HENRIK, a Swedish theologian and church historian, born in Malmö, Sept. 10, 1795. He was educated in the university of Lund, and in 1817 began to read lectures at the seminary there. In 1824 he became extraordinary adjunct of the theological faculty, in 1827 prefect of the seminary and pastor, in 1830 doctor of theology, in 1838 librarian of the city, and in 1844 professor of theology in the university. In 1852 he was appointed state councillor, and minister of instruction and public worship. Among his works are an "Introduction to Theology" (Lund, 1837), "Collection of Swedish Proverbs" (1840), and "History of the Swedish Church," not yet completed.

**REVEL**, or **REVAL**, a town of Russia, capital of the government of Esthonia, situated on the bay of Revel on the S. side of the gulf of Finland, 200 m. W. S. W. from St. Petersburg; pop. in 1855, 27,905. The town consists of two parts, the older and larger of which stands upon a rocky eminence, and the other is built along the beach. Buildings deserving notice are the hall of the nobles, where the diets assembled in former times, and the imperial palace of Catherinenthal, founded and bequeathed to the citizens of Revel by Peter the Great. Revel was founded by Valdemar II. of Denmark in 1218, and was one of the most prosperous towns of the Hanseatic league. Peter the Great obtained possession of it in 1710.

**REVELATION.** See **CHRISTIANITY**.

**REVELATION, BOOK OF THE.** See **APOCALYPSE**.

**REVELS, MASTER OF THE**, formerly an officer in royal or distinguished houses who presided over the Christmas festivities, whence he was often called the "lord of misrule." The office was at first a temporary one, but was made permanent in the royal household by Henry VIII. of England, and included the superintendence of the court festivities throughout the year. It went out of fashion in the latter part of the 17th century.

**REVERE, PAUL**, an American engraver and patriot, born in Boston, Jan. 1, 1735, died there in May, 1818. He was the descendant of a Huguenot, who in France wrote his name Rivoire, and he was brought up to his father's trade of goldsmith. In 1756 he was a lieutenant of artillery in the colonial army, and was stationed at Fort Edward near Lake George. On his return he established himself as a goldsmith, and by his own unaided efforts learned the art of copperplate engraving, and at the breaking out of the revolutionary war was one of the 4 engravers who were then living in America. In 1766 he engraved a print emblematic of the repeal of the stamp act, which was very popular, as was likewise another called "The 17 Rescindors," depicting the future punishment of the 17 who voted in the Massachusetts assembly to rescind at the demand of Gov. Bernard the circular letter addressed to the other colonies. In 1770 he published a print of "The Boston Massacre," and in the same year was one of the grand jury which refused to act because of the action of parliament in making the judge independent of the people. In 1775 he engraved the plates, made the press, and printed the bills of the paper money ordered by the provincial congress of Massachusetts. By that body he was sent to Philadelphia to visit the powder mill there and learn the art of making powder, and on his return set up a mill. He was one of those engaged in the destruction of the tea in Boston harbor, and was sent to New York and Philadelphia to carry to those places the news of what had been done. When the decrees for closing the port of Boston reached that city, he was again sent to those places to

invoke their sympathy and coöperation. When Gen. Gage prepared an expedition to destroy the military stores of the colony at Concord, Warren, at 10 o'clock on the night of April 18, despatched William Dawes through Roxbury to Lexington, and Revere by way of Charlestown, to give notice of the event. Five minutes before the order was received to prevent it, he was rowed across Charles river, and escaping the British officers rode in the still night to Lexington, rousing every house on his way. A little after midnight both messengers reached Lexington, roused Hancock and Adams, and then pushed on to Concord, but were afterward taken prisoners, brought to Lexington, and there released. "The Midnight Ride of Paul Revere" is the title of one of Longfellow's poems. Revere became a lieutenant-colonel in the defence of the state of Massachusetts, and as grand master of the masonic fraternity had extensive influence. After the war he was engaged in the casting of church bells and cannon, and in 1795 assisted at the laying of the corner stone of the Boston state house.

**REVIEW.** See **PERIODICAL LITERATURE**.

**REWBELL, JEAN BAPTISTE**, president of the French directory, born in Colmar in 1746, died in 1810. A prominent advocate of Colmar, he was elected to the states-general in 1789, and defended the principles of the revolution. Being elected to the convention in 1792, he was sent on a mission to the armies at Mentz and in La Vendée, where he showed himself a zealous revolutionist, and wrote to the convention from Mentz during the trial of Louis XVI. strongly urging his condemnation. After the reign of terror, during which he had remained absent from Paris, he was an active member of the committees of public safety and of general security. On the adoption of the constitution of the year III. (Aug. 1795) he was appointed one of the 5 members of the directory, and became its president with the charge of the departments of foreign affairs, justice, and finance. In 1799, retiring from office by lot, he entered the council of the ancients. He was accused of having shared in the peculations of contractors and generals, but was acquitted after a long trial, and Thiers eulogizes his honesty and administrative ability. After the *coup d'état* of the 18th Brumaire (Nov. 9, 1799) he retired to his native department of Haut-Rhin, and fell into obscurity.

**REYBAUD, MME. CHARLES.** See **ARNAUD**.

**REYBAUD, MARIE ROCH LOUIS**, a French author and publicist, born in Marseilles, Aug. 15, 1799. He was brought up as a merchant, made several voyages to America and the Levant, and in 1829 settled in Paris. He wrote for various liberal journals, and in 1830 assumed the direction of the *Histoire scientifique et militaire de l'expédition Française en Égypte* (10 vols. 8vo., with an atlas of 2 vols., 1830-'36), editing more particularly the 6 volumes relating to the expedition under Bonaparte, Kléber, and Menou. He also edited Dumont d'Urville's

*Voyage autour du monde* (1833), and D'Orbigny's *Voyage dans les deux Amériques* (1835). From 1837 to 1840 he published in the *Revue des deux mondes* a review of Utopian theories from Plato to Cabet, under the title of *Études sur les réformateurs et socialistes* (2 vols. 8vo., 1840-43; 6th ed., 1849), for which he received from the French academy the grand Monthyon prize, and was elected in 1850 a member of the academy of moral and political sciences. His most popular work, however, is *Jérôme Paturot à la recherche d'une position sociale* (3 vols. 8vo., 1843), a criticism upon the manners of French society after the revolution of 1830; to this he published a less successful sequel entitled *Jérôme Paturot à la recherche de la meilleure des républiques* (4 vols. 18mo., 1848). Beside many other romances and contributions to periodicals and cyclopædias, he has also written *La Syrie, l'Égypte et la Palestine* (4to., with plates, 1835), in conjunction with Baron Taylor; *La Polynésie* (8vo., 1843); and *L'industrie en Europe* (1856). M. Reynaud was elected to the legislature as a democrat in 1846, as a republican in 1848, and as a reactionist in 1849, when he sustained the acts of the government, and was a member of the consultative commission appointed after the *coup d'état* of 1851.

REYNAUD, JEAN ERNEST, a French author, born in Lyons in 1806. He entered the polytechnic school in 1824, and graduated as a mining engineer. In 1830 he joined the Saint Simonians, and contributed largely to their publications. With Pierre Leroux he conducted the *Revue encyclopédique* (1835), and after its discontinuance the unfinished *Encyclopédie nouvelle*. He was elected to the national assembly in 1848, and was afterward a member of the constituent assembly, acting with the more moderate democrats. After the election of Louis Napoleon as president he opposed his policy, and resigned his seat in April, 1849.

REYNOLDS, a S. E. co. of Mo., drained by the head waters of the Big Black river; area, about 700 sq. m.; pop. in 1860, 3,153, of whom 38 were slaves. It has an undulating surface and fertile soil. The productions in 1850 were 75,925 bushels of Indian corn, 2,882 of wheat, 7,551 of oats, 2,793 lbs. of wool, and 10,900 lbs. of butter. There were 2 churches, and 465 pupils attending public schools. Capital, Lesterville.

REYNOLDS, SIR JOSHUA, an English painter, born in Plympton, Devonshire, July 16, 1723, died in London, Feb. 23, 1792. He was the 10th of a family of 11 children, and was educated in the free grammar school of Plympton, of which his father, the Rev. Samuel Reynolds, was master. In his 18th year, at his earnest request, he was placed with Hudson, the principal portrait painter of the time, and while with him made many careful copies of drawings by Guercino, a practice which probably disqualified him in after life from drawing correctly from the living model. Returning to Devonshire at about the age of 20 in conse-

quence of a disagreement with his master, he established himself as a portrait painter in Plymouth, and through the assistance of Lord Mount Edgcombe, Captain (afterward Lord) Keppel, and other naval officers, commenced his career with considerable success. In 1749 he accompanied Keppel in his ship, the *Centurion*, to the Mediterranean, and during the next 3½ years was engaged in the study of his profession in various cities of Italy. In the Vatican he caught a severe cold which resulted in permanent deafness. The great Venetian masters had more influence upon him than any others. He returned in the latter part of 1752 to England, settled in London, and by a full-length portrait of Commodore Keppel, executed not long after his arrival, placed himself at the head of his profession in England, and in public estimation almost on a level with Vandyke. Thenceforth until the close of his life his career was one of unvarying prosperity. In 1761 he established himself in a spacious house in Leicester square, and soon after his practice increased so rapidly that he was obliged to employ several assistants to paint the draperies and other accessories of his pictures. Dr. Johnson mentions in 1762 that his professional income was 6,000 guineas a year, and it must subsequently have reached a much higher sum, as his price for heads was increased gradually from 10 guineas in 1752 to 50 in 1779, the other sizes being in proportion. Of his portraits, which, as Macaulay has observed, "have preserved to us the thoughtful foreheads of so many writers and statesmen, and the sweet smiles of so many noble matrons," the number is very considerable, and the technical merits, especially with respect to color and chiaroscuro, are of the first order. His portraits of women and children are among the most admired productions of modern art. Among the portraits of distinguished persons painted by him may be mentioned those of Gen. Elliot (Lord Heathfield), Lord Ligonier on horseback, Sterne, Goldsmith, Dr. Johnson, Burke, Boswell, Wyndham, Earl Camden, Fox, Erskine, George III. and his queen, Horace Walpole, Beattie, John Hunter, Garrick between Tragedy and Comedy (for which in 1762 he received 300 guineas), Mrs. Siddons as the tragic muse (a picture which he valued at 1,000 guineas), the celebrated Georgiana, duchess of Devonshire, the earl and countess of Bute, and himself. "Nelly O'Brien," in Lord Hertford's collection, is considered one of his most successful efforts in color. His most remarkable productions in history were his "Count Ugolino and his Sons," painted in 1773, and purchased by the duke of Dorset for 400 guineas; the designs of the cardinal and Christian virtues and the nativity for the window of New college chapel, Oxford; the "Infant Hercules Strangling the Serpents" (1784), now in St. Petersburg, and for which the empress Catharine paid his executors 1,500 guineas; the "Cauldron Scene from Macbeth," "Puck," and the "Death of Cardinal Beaufort," for

which he received respectively 1,000, 100, and 500 guineas; the "Holy Family," in the British national gallery; and "Cymon and Iphigenia," and the "Death of Dido," both in the queen's private collection. His "Strawberry Girl," formerly in the collection of Samuel Rogers, "Samuel Kneeling in Prayer," and the portrait piece in the national gallery representing 3 ladies decorating a terminal statue of Hymen, and the "Puck" above mentioned, illustrate very happily his taste and fancy in painting women and children. Many of these pictures however are hastening to decay, owing to the introduction of wax and other incongruous mixtures, and the use of asphaltum glazes. Burnet says: "So anxious was he to combine the luminous qualities of the Venetian style with the rich transparency of Correggio and Rembrandt, that half his life was spent in trying experiments on the various modes of producing this union, and which has occasioned the decay and destruction of many of his works;" and Northcote tells us that he deliberately scraped away and destroyed Venetian paintings of value in order to discover their technical secrets. Upon the foundation of the royal academy in 1769, Reynolds was chosen its president and knighted. He retained this office until the close of his life, delivering within that period 15 annual discourses on art, which have been translated into various languages. A complete edition of his literary works forms vols. lxxviii. and lxx. of Bohn's "Standard Library," and contains his lectures, some contributions to the "Idler," remarks upon the works of Dutch and Flemish painters during a tour through the Netherlands in 1781, and other miscellaneous pieces, together with a life of the painter by Beechey. In private life Sir Joshua was remarkable for amiability and his varied and instructive conversation. Johnson, Goldsmith, Burke, Garrick, and other distinguished literary men were his intimate associates, and he was one of the founders of the "Literary Club," of which they were prominent members. In the latter part of 1791 he was threatened with loss of sight in consequence of a tumor over his left eye, and at once resigned the practice of his art, the last effort of his pencil being a portrait of Fox. He died, after a painful illness, of a disease of the liver. He was never married, and his fortune, estimated at £80,000, was bequeathed to his niece, Miss Palmer, subsequently marchioness of Thomond. There is a life of him by Northcote, valuable as a record of his conversation and aphorisms, and one recently published by William Cotton. A biography left incomplete by C. R. Leslie is now (1861) preparing for publication under the editorial supervision of Tom Taylor.

**RHADAMANTHUS**, in Greek mythology, one of the three infernal judges, the others being Minos and Æacus. Rhadamanthus judged the people of Asia and Africa, Æacus those of Europe, and the judgments of both were revised

by Minos. Rhadamanthus was reputed the son of Jupiter, and sometimes of Vulcan, and was said to have been born at Cnossus in Crete, and to be the brother of Minos I., king of that island. At Thebes he married Alcmena, the widow of Amphitryon, and subsequently made a descent upon the Cyclades, which he conquered and over which he reigned.

**RILÆTIA**, a province of the Roman empire, which in the reign of Augustus was bounded N. by Vindelicia, E. by Noricum, S. by Gallia Cisalpina, and W. by the country of the Helvetii. Later Vindelicia was added to it, and the province extended as far N. as the Danube. At a still later period it was divided again, the original province being called *Rhætia Prima* and *Vindelicia Rhætia Secunda*. *Rhætia* proper was a mountainous country traversed by Alpine chains, in which the chief rivers of the N. of Italy took their rise. The valleys formed by the rivers *Athesis* (now the *Adige*) and *Enus* (Inn) furnished fine lands for cultivation. But the inhabitants engaged chiefly in the raising of flocks. The people were a mountain race, fond of freedom, fighting, and plunder, and were subdued by the Romans under Drusus and Tiberius in 15 B. C., although they fought with desperate courage. Two roads were made through the province, the one leading from *Augusta Vindelicorum* (Augsburg) to *Comum* (Como), and the other from the same place to *Verona*. Their chief city was *Tridentum* (Trent), and the inhabitants were divided into various tribes. During the latter years of the empire the province became almost depopulated, but after the death of Theodoric it was settled by the *Boioarii*. *Rhætia* proper corresponds to the modern *Grisons*, the *Tyrol*, and some of the northern parts of *Lombardy*.

**RHAMADAN**. See **RAMADAN**.

**RHAZES** (**ABU BEKR MOHAMMED IBN ZAKARIYA AR-RAZI**), an Arabic physician, born at Rai, or Raz (the ancient *Rhagæ*), near Teheran, died probably in A. D. 923. He acquired great philological and philosophical knowledge; but he chiefly studied music, and at the age of 30 was known only for his skill in playing the guitar and for his vocal abilities. When about 40 he applied himself at Bagdad to the study of medicine, and eventually became director of the hospital of that city. He became blind at an advanced age, and refused to have an operation performed upon his eyes, because the surgeon about to undertake it could not tell him how many membranes the eye contained. When it was represented to him that the operation might nevertheless succeed, he still refused, saying that he had seen so much of the world he was weary of it. His works, more than 200 in number, have not all been published. The best known of the books that pass under his name is called *Al-Harî*, but its authenticity is questioned. His treatise on the small pox and measles is the oldest account in existence of those two diseases. It has been translated several times into Greek and Latin,



and into English from the Arabic text by Dr. Greenhill (8vo., London, 1847). His *Ketab Al-Mansoori* is a complete system of medicine in 10 books, drawn from Arabic and Greek sources.

RHEA, a S. E. co. of Tenn., bordered S. E. by the Tennessee river, drained by its branches, and intersected by a range of the Cumberland mountains; area, about 500 sq. m.; pop. in 1860, 4,991, of whom 615 were slaves. The productions in 1850 were 281,124 bushels of Indian corn, 41,777 of oats, 18,624 of sweet potatoes, 3,755 lbs. of tobacco, and 34,537 of butter. Capital, Washington.

RHEA, in Greek mythology. See CYBELE.

RHEA SILVIA. See ROMULUS.

RHEGAS, CONSTANTINOS, a Greek patriot, born in Velestini, the ancient Phœ in Thessaly, about 1753, executed in 1798. He lived for many years at Bucharest, engaged in linguistic and other literary studies. Stimulated by the sufferings of his people and his own relatives, he formed a plan of freeing Greece from the Ottoman yoke. By patriotic songs he labored to inspire the Greeks with his own feelings. In 1796 Rhegas left the service of the hospodar of Wallachia, went to Vienna, and there occupied himself with the formation of a constitution and various preparations for the war. He also published a translation of the 4th volume of Barthélemy's *Voyage du jeune Anacharsis*, and also a large atlas of Greece with both the old and new names of places. From Vienna he went in 1797 to Trieste, in order to meet Bonaparte in Venice, and there some imprudent words and actions brought him under the suspicion of the Austrian police. He was arrested along with a few associates, brought to Vienna, and in 1798 handed over with his companions to the Turkish governor of Belgrade. He had burned his papers and was inflexible in his determination not to betray any one; but though the Turkish minister of the interior had promised that his life should be saved if a payment of 150,000 francs were made, in consequence of some delay in fulfilling the condition, he was condemned and executed. He is still regarded as the forerunner of the Greek revolution. His translation of the *Marseillaise* and his other military lyrics had also a great influence over the feelings of the Greeks.

RHEGIUM (now Reggio), an ancient Greek city of southern Italy, or Magna Græcia, situated on the coast of Bruttium and the Fretum Siculum or straits of Messina, about 8 m. S. E. from Messina. Its origin is ascribed to a colony of Chalcidians from Eubœa, along with a small body of Messenians driven from their country on the outbreak of the first Messenian war (743 B. C.). Another and larger emigration of Messenians thither took place at the end of the second Messenian struggle. It was governed under an aristocratic constitution by a body of 1,000 patricians. At the beginning of the 5th century B. C. Anaxilaus gained pos-

session of the supreme power, soon after conquering Zancle in Sicily, to which he gave the name of Messana, and under his mild administration Rhegium became very prosperous. He was succeeded by his two sons, but the government for 9 years was in the hands of their guardian Micythus, and in 461 they were driven out by a revolution. The Rhegians seem to have retained their liberty for some time, and in 427 supported the Athenians against Syracuse in the Peloponnesian war, but on the second expedition in 415 remained neutral. Subsequently they were engaged in a war with Dionysius the Elder of Syracuse which lasted several years. In 388 Dionysius laid siege to the city, which was desperately defended by the inhabitants under the command of Phylon. After 11 months of resistance it was compelled by famine to surrender. Phylon and his family were put to death, the inhabitants were sold as slaves, and the walls of the city were razed to the ground. It was partially rebuilt by Dionysius the Younger. On the arrival of Pyrrhus in Italy in 280 it formed an alliance with the Romans, and received a garrison of 4,000 Campanian troops. The soldiers, taking advantage of an alleged defection, massacred the male inhabitants, took possession of their property, and made slaves of their wives and children. After the end of the war with Pyrrhus, the Romans reduced the city in 270 after a long siege, executed all the Campanians who had survived the defence, and Rhegium came again into the hands of its former inhabitants. During the Punic wars it remained faithful to Rome. In 91 it suffered severely from an earthquake. After the fall of the western empire it was subject to the emperors of the East. It was taken by Totila in A. D. 549; in 918 it was taken by the Saracens, and in 1060 fell into the hands of Robert Guiscard. In 1283 it was taken by Pedro III. of Aragon, and during the 16th century was three times sacked by the Turks, once under Khair-ed-Deen Barbarossa in 1543, again in 1558, and a third time in 1593. The great earthquake of 1783 entirely destroyed the city, which has since been rebuilt on a new and regular plan.

RHEIMS, or REIMS (anc. *Durocortorum*, and later *Civitas Remorum*), a fortified town of France, department of Marne, situated on the river Vesle, a tributary of the Aisne, 97 m. E. N. E. from Paris; pop. in 1856, 47,601. The cathedral is one of the finest specimens of Gothic architecture in France; it was begun in 1212 and finished in 1241, is 479 feet long, 99 feet broad, and 144 feet high, and has a front ornamented with more than 600 statues and flanked by two square towers 262½ feet high. Its most remarkable monument is the tomb of Jovinus, a citizen of Rheims who became Roman consul A. D. 366. Woollen cloth, flannel, hosiery, cotton goods, &c., are manufactured. The trade is extensive in the wine of Champagne. Rheims was a place of importance before the time of the Romans. Under

the Romans it was made the capital of Belgica Secunda, and was distinguished as a seat of learning. Christianity is said to have been introduced in the 4th century, and when the barbarians invaded Gaul Clovis and his Franks were baptized at Rheims. Though in 1859 it successfully resisted the arms of Edward III., it suffered much in the wars with the English, and was frequently in their possession, till they were finally expelled by the maid of Orleans in 1429. Nearly all the kings of France from the time of Philip Augustus were crowned here.

**RHENISH CONFEDERATION**, or **CONFEDERATION OF THE RHINE**, a confederacy formed in 1806 by 16 German princes, viz.: the kings (formerly electors) of Bavaria and Würtemberg; the elector arch chancellor of the empire; the grand duke (formerly elector) of Baden; the grand duke of Cleves and Berg; the landgrave of Hesse-Darmstadt; the princes of Nassau-Usingen and Nassau-Weilburg, of Hohenzollern-Hechingen and Hohenzollern-Sigmaringen, of Salm-Salm and Salm-Kyrburg; the duke of Ahremberg; the princes of Isenburg-Birstein and of Liechtenstein; and the count Von der Leyen. They communicated to the federal diet their withdrawal from the empire, Aug. 1, 1806, assigning as the reason for the separation the deficiencies of the constitution of the German empire. At the same time Napoleon, under whose auspices this movement had been made by the aforesaid princes, announced through his ambassador to the diet that he would no longer acknowledge a German empire. The emperor Francis II. consequently, on Aug. 6, abdicated as emperor of Germany, and took the title of emperor of Austria. Napoleon constituted himself "protector of the Rhenish confederation," the members of which were all either substantially his vassals or allies, and bound themselves to take up arms against the enemies of France. Within a year or two the confederacy was joined by the elector of Würzburg, the king (formerly elector) of Saxony, the 5 Saxon dukes, the 2 princes of Schwarzburg, the 3 dukes of Anhalt, the new king of Westphalia, and many smaller potentates; so that by the end of 1808 the confederacy extended over 125,000 square miles, with a population of nearly 15,000,000. The reverses of Napoleon in 1813 put an end to its existence, and its members were soon after merged in the present Germanic confederation.

**RHENISH PRUSSIA**, a W. province of the kingdom of Prussia, lying on both sides of the Rhine, bounded N. by Holland and Westphalia, N. E. and E. by Westphalia, Nassau, and Hesse-Darmstadt, S. by Bavaria, Hesse-Homburg, and France, and W. by Luxemburg, Belgium, and Holland; area, 10,351 sq. m.; pop. in 1858, 3,096,629, of whom about  $\frac{1}{4}$  were Roman Catholics, 83,000 Jews, and the remainder Protestants. It is divided into the 5 administrative districts of Cologne, Düsseldorf, Coblenz, Treves, and Aix la Chapelle. The N. part of

the province is level, the E. and S. parts mountainous. The highest peak of the Hundsrück, which forms the W. side of the valley of the Rhine, is 2,015 feet above the sea. Some parts of the chain called the Siebengebirge are from 1,200 to 1,400 feet high. The province is rich in minerals, and is fertile and well cultivated. The manufactures are extensive, and comprise almost every species of industry. The chief cities are Cologne, Aix la Chapelle, Coblenz, Düsseldorf, Treves, Crefeld, Elberfeld, Jülich, Wesel, Berg, and Cleves.

**RHENISH WINES**, the wines produced in the vicinity of the Rhine, especially in the Rheingau, a small district of the duchy of Nassau on the right bank of the river. In the Rheingau are produced the famous Johannisberger, and the almost equally celebrated Asmannshäuser, Rudesheimer, Rottländer, Hinterhäuser, Geissenheimer, and Marcobrunner. Other good Rhenish wines are the Nierensteiner, Liebfrauenmilch, Laubenheimer, and Bacharacher, which are grown on the left bank, while on the right bank is produced the aromatic Hochheimer. Rhenish wines improve more than any other with age, and there are wine cellars in Germany which have Rhenish wine nearly 200 years old. The vintages of 1748, 1760, 1762, 1766, 1776, 1779, 1780, 1781, 1783, 1811, and 1822 are celebrated, and particularly the last three. The vines on the Rhine were planted by the Romans in the 3d century, and according to tradition the first vine in the Rheingau was planted by Charlemagne.

**RHETICUS** (GEORG JOACHIM), a German mathematician and astronomer, born at Feldkirch in the Tyrol in 1514, died in 1576. At the age of 28 he was appointed professor of elementary mathematics in the university of Wittenberg, and taught there for two years, but relinquished the position to become the disciple and assistant of Copernicus. The ill will of the leading advocates of the Ptolemaic system was excited against him by his letter entitled *Narratio de Libris Revolutionum Copernici* (1540), in which he endeavored to show that the rotation of the earth about the sun is not a merely probable hypothesis, as Copernicus announced it, but an incontestable truth.

**RHETORIO**. See ORATORY.

**RHETT**, ROBERT BARNWELL, an American politician, born in Beaufort, S. C., Dec. 24, 1800. He is the son of James and Marianna Smith, and adopted the name of Rhett, which was that of a colonial ancestor, in 1837. He was educated for the bar, and in 1826 entered public life as a member of the state legislature. In 1833 he was elected attorney-general of South Carolina, and during the nullification movement acted with the ultra wing of the state rights party. In 1836 he was returned to congress from the Beaufort district, and served as a member of the house of representatives until 1849; and in Dec. 1850, he was elected a U. S. senator. In his legislative capacity he advocated the doctrines of Mr. Calhoun, and was

the first who proposed on the floor of congress a dissolution of the Union. During the agitation of the question of secession in South Carolina in 1851-'2 he advocated the immediate, and, if necessary, the separate withdrawal of the state from the Union; and upon the defeat of his party he resigned his seat in the U. S. senate. Upon the death of his wife in the latter part of 1852 he retired to his plantation, and took no part in public matters until the election of Mr. Lincoln to the presidency. He was a leading member of the state convention which, on Dec. 20, 1860, passed an ordinance of secession, and the address which declared the reasons for this measure was prepared by him. Subsequently he was a delegate from Charleston to the convention of seceding states at Montgomery, and was chairman of the committee by which the constitution of the "Confederate States of America" was reported. He is now (July, 1861) a delegate from South Carolina to the congress of the "Confederate States." His political views have of late years frequently been given to the public through the columns of the "Charleston Mercury," a newspaper owned by himself and conducted by his son, Robert Barnwell Rhett, jr.

**RHEUMATISM** (Gr. *ῥευμα*, a flow, discharge). Acute rheumatism is an inflammation of the joints, characterized by general fevers, by pain, heat, redness, and swelling of the joints affected, and by a tendency to leave one joint suddenly and fasten upon another. The affection sometimes commences by chills and fever, and general uneasiness; and these symptoms (rheumatic fever) may last for 24 hours or more before the local manifestations show themselves. More frequently the local symptoms make their appearance at the same time with the fever, and occasionally they are present some little time before it supervenes. The pain in the joint or joints affected, commonly but little felt while the patient is perfectly quiet, becomes intense on the slightest motion, so that he is rendered completely helpless. The superficial joints become swollen and tense, they are hotter than natural, and the skin covering them is generally more or less reddened. The swelling is sometimes mainly caused by effusion within the capsular ligament of the joint itself, at others by the inflammation and thickening of the fibrous tissues external to the joint. The pulse is generally full, strong, and moderately frequent, rarely rising over 100 beats in a minute; the skin is warm, and copious sour perspirations are commonly present; sweating was present in rather more than  $\frac{1}{4}$  of the cases noted by M. Louis. The tongue is thickly coated, the bowels somewhat constipated, and the appetite completely lost. The inflammation at first affects one or two joints, rarely three; after a variable time it commonly leaves the joints first affected as suddenly as it attacked them, and fastens on some other articulation; often however new joints are attacked without the disease leaving its original seat. As a rule the larger joints

are the ones most liable to be attacked, the knees, elbows, ankles, wrists, and hips; more rarely the smaller joints of the toes and fingers become affected. Beside the articulations, acute rheumatism frequently attacks the heart, not by metastasis, or transference of the inflammation from one part to the other, but seizing on the fibrous textures of the heart as on one of the series of textures liable to the disease. Sometimes the pericardium is attacked (pericarditis), sometimes the lining membrane of the heart's cavities (endocarditis). (See HEART, DISEASES OF.) The younger the patient, the more liable is the heart to be affected; so that when rheumatism occurs previous to adult age, the heart is attacked in a large majority of cases. The rheumatic constitution is frequently hereditary, and rheumatism is peculiarly a complaint of cold, damp seasons and climates; but beyond this we know but little of the causes which induce it. The duration of the disease varies in different cases, sometimes disappearing in 10 or 12 days, sometimes lasting for months, while in other cases again it may lapse into a subacute or chronic state and continue indefinitely. Rheumatism is, when uncomplicated, rarely attended with immediate danger to life; but by damaging the heart it often lays the foundation for incurable disease. Occasionally fatal cases are met with. The writer has known one case in which death was preceded by violent delirium, apparently the result of acute meningitis; no post-mortem examination was permitted, but in a similar case seen by Valleix, the autopsy threw no light on the cause of death.—Acute rheumatism has been treated in a great variety of ways. Bleeding, mercurials, mercurials with purgatives, opium, sulphate of quinine in large doses varying from 20 to 90 grs. per diem, nitrate of potassa in doses of  $\frac{1}{4}$  oz. to 1 $\frac{1}{4}$  oz. dissolved in a large quantity of bland fluid and drunk in the 24 hours, have been at various times resorted to. Of these methods, those by large doses of sulphate of quinine and by nitrate of potassa have both an undoubted influence in controlling and cutting short the disease, and the treatment by quinine appears to be most successful in the acutest and most violent attacks; they are both however subject to inconveniences and dangers which more than counterbalance their advantages. The treatment which is now most generally relied on is the alkaline. Tartrate of potash and soda (Rochelle salt) or acetate of potash is given in full doses short of producing purgation, until the urine is rendered alkaline. Occasionally a purgative may be required, or an opiate may be given at night to procure sleep. The treatment by lemon juice, advocated by Dr. Garrod, is in truth an alkaline treatment, the acid citrate of potash contained in the lemon juice being eliminated by the kidneys as a carbonate.—Chronic rheumatism presents itself under two forms. In one the joints are swollen and painful, the pain being aggravated by motion;

there is however no general fever, and the appetite may be good and the digestion sound. The affection is exceedingly obstinate, attacking new joints without leaving the ones first affected; it frequently attacks the smaller joints, rendering them permanently swollen and deformed, while the immobility to which the joints are sometimes reduced may cause atrophy of the muscles connected with them. The treatment is unsatisfactory; sometimes alkalies or diuretics are of service, sometimes iodide of potassium seems of use; while the native sulphur waters, such as those of Sharon, St. Catharine's, the Virginia sulphur springs, &c., used both externally and internally, are frequently of great service. In the second variety of chronic rheumatism, sometimes termed passive rheumatism, the joints are neither red nor swollen, but simply stiff and painful, the pain being increased by motion. It does not prevent labor or exercise, only rendering them painful. It is aggravated by cold and damp and relieved by heat. Warm salt water baths, and the use of flannel and stimulating liniments, afford some relief. Where it is possible removal to a warm climate is advisable. In the treatment of rheumatism the homœopathists depend mainly upon aconite, bryonia, pulsatilla, rhus toxicodendron, and other comparatively new remedies; and the hydropathists claim great success from the cold water treatment.

RHIN, BAS. See BAS-RHIN.

RHIN, HAUT. See HAUT-RHIN.

RHINE (Ger. *Rhein*; Dutch, *Ryn*; Fr. *Rhin*; anc. *Rhenus*), one of the principal rivers of Europe, having its sources in the Swiss canton of Grisons, near lat. 46° 32' N., long. 8° 53' E., and flowing into the North sea by an extensive delta of 6 mouths in Holland, after a circuitous course of nearly 800 m. The Rhine is usually divided into 3 parts, the upper, middle, and lower, the first of which lies within and along part of the boundary line of Switzerland, the second between Basel and Cologne, and the third between Cologne and the sea. The river originates in the Lepontine Alps in 3 branches, the most western of which is considered the principal source. It rises in two small lakes, situated on the E. side of a mountain of the St. Gothard group about 7,500 feet above the sea, and runs as a torrent for about 12 m. during which it descends nearly 4,000 feet, and is joined at Dissentis by the second branch. It then flows in a general E. by N. direction for about 36 m. to Reichenau, where it is met by the third branch and becomes a considerable stream, nearly 250 feet wide, navigable for river boats. Having continued the same course to Chur, it thence flows through a valley about 50 miles long and from one to two miles wide in a northerly direction to the lake of Constance, and for part of the distance forms the boundary line separating the principality of Liechtenstein and Austria from Switzerland. The surface is here 1,844 feet above the sea. After issuing

from the lake at Constance it flows for a few miles in a westerly direction, till it enters the Untersee, which is about 30 feet lower than the lake of Constance. It continues its course in the same direction to the falls of Schaffhausen, a little way below the town of that name, where the surface of the river is 1,260 feet above the sea, and the falls are 70 feet in height. Below these falls the general course is still westerly, but very tortuous; and the river flows between mountains for about 50 m. to Laufenburg, where the navigation is again interrupted by a cataract. The bed is here narrowed to about 50 feet, and boats ascend and descend by means of ropes after being unloaded. About 10 m. below Laufenburg there is a rapid of considerable length, which is exceedingly dangerous, though it does not stop navigation. This is the last impediment to the navigation of the upper Rhine. Below this rapid the level of the river is 850 feet above the sea, and it is only 50 feet less at Basel. Above this point the Rhine receives numerous tributaries, the most important being the Aar, which brings the drainage of the greater part of Switzerland. Between the lake of Constance and Basel the Rhine forms the boundary line between Baden and Switzerland.—Where the middle Rhine begins at Basel, the river has left the mountainous region, and changed its course to a northerly direction. It flows for nearly 200 m., to Mentz, through a valley from 40 to 50 m. wide, extending between the Black forest and other mountains connected with that range on the E., and the Vosges and the Haardt mountains on the W., forming the boundary line between Baden and France, and Baden and Rhenish Bavaria, and passing through Hesse-Darmstadt. Between Basel and Strasbourg, a distance of about 80 m., the fall of the river is 4½ feet per mile, and the current consequently very rapid. The bed is wide and obstructed by numerous movable sand banks and small islands, which render the navigation of this part intricate and dangerous. For the next 50 m., to Germersheim, the islands increase in size and are less liable to shift their position. Below Germersheim islands are rare, and the river flows sluggishly in large bends to Mentz, where its surface is only 274 feet above the sea. Between Strasbourg and Mentz it is navigable for boats of about 100 tons burden, which descend with the current, but in going up are tracked, chiefly by horses. Between Mentz and Cologne the course of the river is first W., then N. N. W., and afterward mostly N. W. It first forms the boundary between Hesse-Darmstadt and Nassau, and then between Nassau and the Prussian Rhenish province, the latter of which it enters near Coblenz. This part of the river runs between two mountain regions, where in many places the hills come so close to the banks of the river that there is scarcely room for a road. The produce of the extensive vineyards in this neighborhood is

Known as Rhenish wines. There is a ledge of rocks at Bingen which prevents steamers and barges passing during foggy weather or at night. The surface of the water at Cologne is 110 feet above the sea. During its middle course the Rhine receives many tributaries; but with the exception of the Moselle, those from the W. are all short and not navigable. On the right or E. side the tributaries are much larger and more numerous, the most important being the Neckar, Main, Lahn, and Sieg.—The lower Rhine extends for about 300 m. from Cologne to its mouth, and flows through a low level country, with the hills of Sauerland near its E. bank between Cologne and Düsseldorf. From Cologne to Wesel its course is mostly N. N. W., though very tortuous. From Wesel to the frontiers of Holland it flows in a N. W. direction. Below Cologne the Rhine is navigable for sea-going vessels, and the fall from thence to its mouth is only about 4 inches per mile, and the current consequently extremely sluggish. Shortly after entering Holland, near the village of Panterden about 200 m. from its mouth, the Rhine divides into two arms, the southern of which takes the name of Waal, and the northern preserves the name of Rhine. The Waal is here 210 yards broad, while the Rhine is only 114 yards, and about  $\frac{2}{3}$  of the volume of water runs into the former. After the separation the Rhine flows N. N. W., and near Arnhem, 12 m. lower down, it again divides into the Yssel, which runs N. to the Zuyder Zee, and the Rhine, which flows W. At Wyck, about 80 m. lower down, the Rhine divides for the third time, into the Leck and Kromme Ryn (Crooked Rhine), the former of which is the larger river. The Kromme Ryn runs N. W. to Utrecht, where it divides for the last time into the Vecht, which flows to the Zuyder Zee, and the Oude Ryn (Old Rhine), which continues westward past Leyden. The mouth of the Oude Ryn was formerly obstructed by dunes or sand hills, and the river did not reach the sea; but in 1807 a canal was cut through them, and it now communicates with the North sea at Katwyk, a few miles N. W. from Leyden. Before it begins to form the delta the lower Rhine is augmented by the Erft, Ruhr, and Lippe, all of which are navigable. The Yssel was originally a canal cut by Drusus to unite the Rhine with the river now called Oude Yssel (Old Yssel). The Leck, or middle branch of the Rhine, was also originally a canal made by the Roman general Corbulo; but in A. D. 839 its bed was so much enlarged by a flood that it became the main stream. The delta of the Rhine is bounded N. by the Zuyder Zee, E. by the Yssel, S. by the Waal and Meuse, and W. by the North sea; it comprehends the three Dutch provinces of North and South Holland and Utrecht, and about  $\frac{2}{3}$  of Gelderland, all of which country would be subject to inundations were it not protected by embankments. These embankments begin in the Prussian district of Düsseldorf, extend

along the banks of the different arms of the Rhine to the sea, and are generally from 25 to 30 feet above the lowest level of the river.—The basin of the Rhine is estimated at 80,000 sq. m., of which 13,000 belong to the upper, 40,000 to the middle, and 27,000 to the lower Rhine. The river is generally covered with ice for from 6 weeks to 2 months in winter; and when snow accumulates and a thaw suddenly sets in, the lowlands are liable to inundations that are sometimes attended with great loss of both life and property. The different arms of the Rhine are united by numerous canals, and the river itself is connected by canals with the Saône and Rhône, the Scheldt, Meuse, and Danube; and an extensive trade is carried on upon all these as well as the chief navigable tributaries, the Moselle, Main, Ruhr, and Neckar. The annual traffic of the whole amounts to 5,250,000 tons, of which 3,500,000 belong to the Rhine exclusively. Switzerland, Baden, France, Bavaria, Hesse-Darmstadt, Prussia, and Holland all lay toll duties on vessels and goods passing their boundaries; but of late years these duties have been greatly reduced. The Rhine is renowned for the picturesque beauty of the scenery in the upper and middle part of its course, and is annually visited by a great multitude of tourists. It is navigated by steam vessels belonging to various companies which ply between the principal towns on its banks. It is crossed at several points by pontoon bridges, and many of the principal places on either side are connected by railroads. There is great discrepancy among ancient writers with regard to the number of mouths by which the waters of the Rhine formerly flowed into the sea. Some speak only of two; others say there were three; and Cæsar states that there were several branches.

**RHINOCEROS** (Gr. *ῥίς*, nose, and *κερας*, horn), a pachyderm mammal, surpassed in size among present terrestrial animals only by the elephant, and perhaps by the hippopotamus. The head is long and triangular, and from the upper surface of the end of the nose there springs a single or double horn, composed of a solid mass of agglutinated hairs or horny fibres; this is supported on the nasal bones, though not connected with them, belonging entirely to the skin and removed with it; it is often more than 3 feet long, and gently curved backward, and so sharp as to make it a very formidable weapon; when there are two horns, the hinder is much the shorter. There are no canine teeth, and the incisors sometimes fall out when the animal is full-grown; the molars are  $\frac{7}{2}$ -7, with lunate ridges; the nose is blunt and rounded, and the upper lip elongated and very movable; the eyes are small, and the ears moderate, tipped with rigid hairs; the body is very bulky, the legs short and strong, and the feet 8-toed with as many broad hoofs; the tail is short, round at the base, compressed laterally toward the end, and hairy at the tip; on the hind feet are sebaceous glands opening on the



posterior surface, in a sacculated inversion of the skin, as on the anterior surface of the feet of sheep; the mammae are two, and inguinal. The skin is naked, very rough and hard, divided into large folds which give to the animal a shielded appearance; it is impervious to the claws of the lion and tiger, will turn the edge of a sword, and is impenetrable to ordinary musket bullets. The stomach is large and simple, the intestinal canal 8 times as long as the body, the villi of the small intestine greatly developed, the large intestine very wide, and the cæcum sacculated. The ribs are 19 pairs, the iliac bones very wide, and the femur with a prominent ridge on the outer border terminating in a hook-like process and with the great trochanter exceedingly prolonged; the incisor teeth seem to be developed in an inverse ratio to the horns; the brain is large, but the relative size of the cerebrum, especially the upper and anterior portion, is less than in the elephant. The rhinoceros is found in the warm regions of Asia and Africa, living with the elephant in forests, and feeding on herbage and leafy twigs and shrubs. It is a peaceable animal unless when irritated; it then charges upon its enemy with the head down and the horn forward; though not very active, its great weight and strength make it a formidable assailant, and a match even for the elephant. The senses of smell and hearing are so acute, that the hunter must approach against the wind and in perfect silence, else the shy animal will be alarmed and retreat; it is hunted for sport by Europeans, and the natives eat the flesh, and sell the skin to traders for the manufacture of canes, whips, and defensive armor, and the horns for boxes and cups. In its native forests the rhinoceros has a tortoise-like appearance, with its stolid expression, slow movements, thick armor, short legs and tail, and curved upper lip.—Several species have been described, of which the best known is the single-horned or Indian rhinoceros (*R. unicornis*, Linn.; *R. Indicus*, Cuv.). This animal measures about 12 feet in length, with a circumference of the same, and a height of 6 feet; the skin is very thick, arranged in broad folds in many parts, rough and tuberculated, and of a deep purplish gray color. It was well known to the ancients, and is generally believed to be the unicorn or *reem* of the sacred writings, though not of the Arabian poets, which was either a wild bull or antelope. It leads a quiet indolent life, wallowing on the marshy borders of rivers and lakes, and bathing in their waters; it moves slowly, the head carried low as in the hog; its strength enables it to pass with ease through the thickest jungles; it is found in the warmer parts of continental India. In captivity, especially if taken young, it is gentle, obedient, and grateful for kind treatment, with occasional paroxysms of rage without apparent cause; it is fond of bread, fruit, and particularly of sweets, collecting and holding its food by the long upper lip; it is not uncommon in

menageries, and has been trained to perform simple tricks by modern showmen, but its intelligence is far inferior to that of the elephant; though these two animals are said to have a natural antipathy to each other, they agree very well together in confinement. The Java rhinoceros (*R. Sondaicus*, Horsf.), with a single horn, is confined to Java; the epidermis is arranged in pentagonal shields. The Sumatran rhinoceros (*R. Sumatrensis*, Cuv.) is a smaller species with two horns and a comparatively smooth skin.—The black African rhinoceros (*R. bicornis*, Linn.; *R. Africanus*, Camper), the *borélé* of the S. African aborigines, has two horns, and a smoother skin, wrinkled instead of folded; the incisors are either latent or fall away early; the horns, which as in the other species occur in both sexes, are brightly polished by rubbing against the trees, and the posterior is only  $\frac{1}{2}$  the length of the anterior, the latter being rarely more than 18 inches. The general color in the male is black, in the female pale yellowish brown with purplish tints on the head, and the groins flesh-colored; the head seems too deep in proportion to its length, giving it a very clumsy appearance; the upper lip is scarcely at all prolonged; the neck short and thick, with a deep furrow where it joins the head, and a rudimentary hump on the shoulder. In size and habits it resembles the Indian species; it was formerly found even on the slopes of Table mountain, but has now been driven far beyond the limits of the Cape Colony into the interior, where it is seldom molested. They keep concealed by day, wandering at night in search of water and food, especially the branches of the wait-a-bit thorns; the gait is equal to that of a good horse, and when disturbed the head is carried high; they are usually seen singly or in pairs. They are suspicious and savage, attacking the traveller, and so lean that the flesh is rarely eaten; wherever the footprints are seen, the ground and bushes are found torn up; this they do, not from rage, but in a mere wanton display of strength, as a bull gores the earth with his horns; they also dig the ground with the fore feet, throwing it backward in the manner of a dog. Dr. A. Smith, in his "Zoology of South Africa," makes 3 species; Dr. Livingstone thinks that all the species made by naturalists beyond two are based on mere differences in size, age, and direction of horns, which vary much within the limit of a single species. The *R. keitloa* (A. Smith) is a rather smaller species, with two horns nearly equal in length, with more slender head and longer neck than in the *borélé*; the general color is pale brownish yellow, with a black mark on the inside of the thighs; the upper lip is elongated; it is a swift, fierce, and dangerous animal, comparatively rare, and not found further south than lat. 25°.—The white rhinoceros (*R. simus*, Burch.), the *mohooohoo* of the Bechuana, is the largest of the genus; the color is pale brownish white, with purplish tints on the shoulders and posterior parts; the

head is comparatively long and slender, the face concave, forehead convex, neck long with 3 well marked wrinkles on nape, the nose truncated, the upper lip perfectly square and ox-like, and the shoulders with a distinct hump; the horns are two, the first very long and pointed, the second just behind it, short and obtuse. This is a rare species, timid, unsuspecting, easily captured on account of its slow movements, and much prized by the natives for its fat flesh; the food is principally grass. The Bechuanas call the rhinoceros by the general name of *chukuroo*. The best friend of this animal is a bird, which warns it, sleeping or waking, of the approach of danger; it is called rhinoceros bird, and is described under that title.—The rhinoceros played an important part among the animals of the tertiary and diluvial epochs, numerous species of large size occupying cold countries of Europe, where they now could not exist. Since 1781 many fragments have been found in Germany, Italy, France, England, and Russia. A few species have been detected in the lower miocene of France, of which the *R. tapirinus* (Pomel), of the size of a tapir, belonged to Kaup's group of *acerotherium*, characterized by 2 large incisors in each jaw, 4 toes on the anterior feet, and probably by a very small, if any, nasal horn. In the upper miocene of France and Germany occur many species which De Blainville has united into the single *R. incisivus*, without bony partition between the nostrils, with 2 large incisors in each jaw and 3 toes on all the feet. In the pliocene of France and England are species without bony nasal partition and with moderate incisors, like the *R. megarhinus* (Cuv.). The best known fossil species is the *R. tichorhinus* (Cuv.), of the diluvial deposits of Siberia and the most of Europe, contemporary with the mammoth. The most remarkable specimen was found in 1781 in arctic Siberia by a hunter; the body was well preserved and half buried in the frozen sand, in lat. 64° N.; it was 11½ feet long, with a skin like leather covered with short hair; the nasal bones curved in front of the nose to unite with the intermaxillaries, and the partition between the nostrils was bony to the extremity, giving great solidity to the nose for the support of the large horns; these were two, further separated than in the living species; the incisors fell out in the adults, and the symphysis of the lower jaw was very long; coming nearest to the *R. bicornis* of Africa, it had a longer and narrower cranium, more bulky body, and shorter and stouter limbs. It occurs in diluvial sands, in caverns, and in bone breccia. This genus has also been found in the tertiary and diluvial deposits of Asia; Cantley and Falconer describe 4 species among the Sivalik hills of northern Hindostan. The most singular fact in connection with the geological distribution of the rhinoceros, is its occurrence during the diluvial period in America, like the elephant not now existing on this

continent; several species are described by Prof. Leidy and others from the tertiary of Nebraska and the neighboring territories. The genus *elasmotherium* of Fischer probably comes near if not in the rhinoceros family; judging from the teeth, and the size, form, and thickness of jaw, it must have been an animal of heavy proportions, with the size and habits of the rhinoceros, and essentially herbivorous; it was found in Siberia.

**RHINOCEROS BIRD**, one of the names of the African genus *buphaga* (Linn.). (See OXPECKER.) It makes a harsh cry in the ear of the sleeping rhinoceros, which awaking rushes off into the forest to escape the hunter; it perches on the animal's back, returning when frightened or swept off by the branches, and remains with it all night. Cumming says he has often shot the rhinoceros at midnight at fountains, and that these birds, imagining "chukuroo" was asleep, would remain until morning, and on his approaching, before taking flight, they would try to awaken him from his deep sleep. This bird also attends the hippopotamus, for the similar purpose of feeding on the ticks and other parasites which infest the skin.

**RHINOPLASTY**. See AUTOPLASTY.

**RHODE ISLAND**, one of the 13 original states of the American Union, and the smallest of the 34 of which the Union is now composed. It is bounded N. and E. by Massachusetts, S. by the Atlantic ocean, and W. by the state of Connecticut, and lies between lat. 41° 18' and 42° 8' N., and long. 71° 8' and 71° 53' W.; extreme length N. and S. 47½ m., greatest breadth E. and W. 40 m.; area, exclusive of Narraganset bay, which divides the state into two unequal parts, 1,046¼ sq. m., or 835,840 acres, of which 326,888 acres are improved. The population in 1730 was 17,935; in 1755, 40,414; in 1770, 59,678; in 1790, 68,825; in 1800, 69,122; in 1810, 75,188; in 1820, 83,059; in 1830, 97,212; in 1840, 108,830; in 1850, 147,545; and in 1860, 174,619. According to the census of 1860, the population in that year was distributed as follows:

Counties.	Whites.			Colored.		
	Males.	Females.	Total.	Males.	Females.	Total.
Bristol .....	4,130	4,469	8,599	133	155	288
Kent .....	8,088	9,006	17,044	184	125	259
Newport ...	10,196	10,573	21,074	860	462	1,322
Providence.	51,007	54,814	105,821	698	1,079	1,977
Washington	8,931	9,193	18,129	256	300	556
Total .....	82,302	88,365	170,667	1,881	2,121	3,952

The principal cities and villages are Providence, Newport, Bristol, Warren, Pawtucket, Woonsocket, Natick, Lonsdale, and Pawcatuck. Rhode Island was formerly the abode of the Narraganset Indians, a large and powerful tribe, of which there is a small remnant. In 1709 the sachem Ninegret gave a quitclaim to the colony of all the Indian lands, except a reservation in the town of Charlestown, portions of which have from time to time been sold. Of this there remains 2,685 acres, 637 of which

are arable, and the remainder swamp and timber lands. The tribe embraces 122 souls, divided into 84 families, all of which are of mixed blood. They possess a church and a school house, and about a third of the tribe can read and write.—Narraganset bay, which divides the state into two unequal parts, extends N. from the Atlantic ocean a distance of 30 m. It is from 3 to 12 m. wide, and holds in its embrace the islands of Aquetneck, or Rhode island, Canonicut, Prudence, and several smaller ones. The first named, which has been called the "Eden of America," is 15 m. long, from 3 to 3½ m. wide, and contains about 50 sq. m. Near its S. end is Newport, the most celebrated watering place in the Union, which is resorted to by thousands of invalids and the fashionable during the summer months. Newport harbor, which lies between Canonicut and Rhode island, is one of the finest in the world. Its depth of water, which is sufficient for the largest ships, its facility of access with all winds, its excellent anchorage, its means of rapid communication with all parts of the country, and its abundant supply of fresh water, have recommended it to the government as a desirable place for a great naval establishment. It is now protected by Fort Wolcott on Goat island, and by the larger fortification near its entrance known as Fort Adams, the latter a work of great strength. On the opposite shore of Canonicut is Fort Brown on the "Dumpling" rocks, used in the war of 1812, but now in a state of ruin. Canonicut is 7 m. long and about 1 m. wide. Prudence island lies N. E. of Canonicut, and is of less extent. Projecting southward from the mainland on the E. is an extensive peninsula which divides Narraganset bay and forms Mt. Hope bay, at the head of which Taunton river enters. On this is the flourishing town of Fall River, partly in Massachusetts. The Rhode Island portion is, by mutual agreement, about to be ceded to Massachusetts. This, with the cession to Rhode Island of the town of Pawtucket and part of Seekonk, settles a controversy of two centuries with respect to the E. boundary of Rhode Island. In different parts of Narraganset bay are several other small islands. About 11 m. S. E. of Point Judith is Block island, 7 m. long and 4 m. wide, which is almost severed by a large salt pond. The islanders support themselves chiefly by fishing. Sheep in considerable numbers are raised, and excellent butter and cheese are made there. The island forms the town of New Shoreham, and is a portion of Newport co. It was first seen by Verazzano in 1524, and received from him the name of Claudia, after the wife of Francis I. of France. Subsequently the Dutch captain Adrian Block visited it, since which time it has borne his name. In 1664 the general assembly of Rhode Island resolved, "that the governor be desired to send to Block island to declare unto our friends the inhabitants thereof that they are under our care, and that they admit not of any other to

bear rule over them but the power of this colony."—The rivers in the state are small, yet, having considerable falls, their waters are used over and over again during their whole course for manufacturing purposes. The Pawtucket or Blackstone river rises in Massachusetts, runs south, and flows into Providence river. At Pawtucket it has a fall of from 80 to 40 feet, below which it bears the name of Seekonk river. The Woonasquatucket and Mooshassuck discharge themselves in a cove within the city of Providence which flows into Providence river. Pawtucket river enters Narraganset bay 5 m. below Providence. It courses through the central parts of the state and abounds with falls; hence it is used to its full extent for mills and various kinds of manufacturing establishments. Pawcatuck river waters the S. W. section of the state, and falls into Stonington harbor. Along its course are many thriving manufacturing villages. Providence river is the northern arm of Narraganset bay, and is navigable to the city of Providence for ships of 1,500 tons burden.—The surface of the state is generally rough and hilly, but has no elevations which can with propriety be called mountains. Mt. Hope, the seat of the famous Indian king Philip, near Bristol, is a considerable elevation, but the hills near Woonsocket in the north, and Hopkins hill near the centre of the state, have a greater height above the sea. The other hills are comparatively of slight elevation, and are often covered with soil to their very summits, exposing but a few naked rocks on their sides. The western portions of the state are very uniform and simple in their geological character, the primary stratified and unstratified rocks generally prevailing with great uniformity. Cumberland, on the contrary, is a very complicated geological district. As a general thing it may be said that the geological formation which distinguishes southeastern Massachusetts extends to the northern parts of Rhode Island. The southern section is chiefly of a later era. Anthracite coal of an inferior quality exists in Cumberland and on the island of Rhode Island, in both of which localities it has been mined to a considerable extent. It occurs in the same graywacke formation with the Massachusetts coal. Iron ore is found in several places. Limestone abounds in the northern section, and there are some excellent quarries of marble, freestone, and granite. Serpentine is also abundant.—The climate of the whole state is mild, owing to its proximity to the sea, which tempers the severity of winter and mitigates the heats of summer. Newport and its vicinity, more affected by the vapors from the Atlantic, is even milder than the northern parts of the state. The soil is moderately fertile, but rough in many parts and difficult of cultivation. The island of Rhode Island was formerly well wooded, but it was entirely denuded of its forest trees while in possession of the British in the revolutionary war. It is now noted for its fine cattle, sheep,

butter, and cheese. The soil of the islands is slaty, yet they are the most productive portions of the state. There is very little alluvial land. Pine plains are found in several places. Oak, walnut, and chestnut are the prevailing growth, with some pine. In the S. part are some large cedar swamps. Indian corn, rye, and oats are the principal cereals. Wheat is rarely sown. On the whole the lands are better adapted to grazing than for the cultivation of cereals. The following table gives the amount of capital invested in agricultural pursuits in 1860, with the number of sheep and of horses not employed in farm labor:

Counties.	Value of farms.	Value of farming utensils.	Value of live stock.	Number of sheep.	Horses not on farms.
Providence.	\$7,842,714	\$208,940	\$712,000	2,393	8,459
Newport...	4,799,125	119,125	496,440	14,656	730
Washington	8,420,225	119,557	498,554	12,230	190
Bristol.....	1,224,235	60,675	106,087	956	127
Kent.....	2,210,866	63,188	252,577	2,335	402
Total.....	\$19,497,215	\$571,490	\$2,065,953	32,609	4,938

—The following table gives the statistics of the manufacturing establishments of the state producing to the value of \$500 or more annually, for the year 1860:

Counties.	No. of establishments.	Capital invested.	Value of raw material.	Value of annual product.
Providence.	890	\$18,121,185	\$17,246,059	\$34,872,385
Newport...	59	797,500	575,545	1,188,351
Washington	72	1,790,200	2,447,563	3,880,149
Bristol.....	73	996,350	1,505,233	2,825,928
Kent.....	80	2,685,960	2,853,926	7,853,479
Total.....	1,208	\$24,381,195	\$24,410,631	\$50,070,242

The chief water power in the state is in Providence and Kent counties; and, although the streams are not large, they have considerable fall, which has been taken advantage of to the fullest extent. Five towns in Newport co. are on islands where there are no streams, hence the limited amount of capital employed in manufacturing. Beside the superior advantages of Providence co. in water power, the city itself is largely engaged in manufacturing by steam power, having nearly 100 steam engines employed. The following table gives the number of mills devoted to particular branches of manufacture, together with some agricultural statistics:

Counties.	Cotton mills.	Woolen mills.	Iron mills.	Acres of improved land in farms.
Providence.....	87	85	32	104,081
Newport.....	9	1	..	52,974
Washington.....	23	25	..	106,468
Bristol.....	8	..	..	11,636
Kent.....	26	7	1	51,296
Total.....	147	68	33	326,358

—The state has a limited foreign commerce, but its coasting trade is extensive. Its shipping in 1860 amounted to 39,416 tons; value of foreign imports, \$876,697; of exports, \$211,947. Tonnage entered from foreign ports, 32,257; cleared for foreign ports, 29,127; number

of vessels arrived coastwise, 6,915. The exports consist chiefly of manufactured goods of cotton and wool, potatoes, onions, hoop poles, apples, &c.; the imports, of molasses, sugar, coal, cigars, oil, lumber, fruit, pig and bar iron, ivory, salt, &c. The fisheries are considerable. About 200,000 barrels of menhaden are annually taken, which are sold at 20 cents a barrel, yielding about \$40,000. They are used for bait for mackerel fishing, for oil, and for manure. Of other fish, there are annually taken 60,000 barrels of scup, one quarter of which are used for manure; 200,000 blue fish, averaging 2½ lbs. each; and 8,000 lbs. of tautog. These are chiefly sold in the markets of New York, Philadelphia, and Providence. Bass and mackerel are also taken, and command a ready sale.—The following table exhibits the extent and cost of the railroads lying wholly or partially within the state:

Railroad corporations.	Length of road in miles.	Cost and equipments.
Providence and Boston.....	44.00	\$3,160,000
Providence and Worcester.....	44.01	1,761,542
Providence, Warren, and Bristol.....	18.60	437,667
New York, Providence, and Boston (Stonington).....	50.00	2,158,000
Providence, Hartford, and Fiskville.....	122.00	4,202,519

A railroad from Newport to Fall River, Mass., has lately (Aug. 1861) been chartered, and is soon to be put under contract.—On Jan. 1, 1861, there were 20 stock and mutual insurance companies in the state. The capital of the 9 stock companies was \$1,200,000; fire risks outstanding, \$34,579,816; marine risks, \$4,318,007; fire risks outstanding of 11 mutual companies, \$37,368,410. Beside these companies chartered by the state, there were 37 insurance companies chartered by other states having offices in Rhode Island. All the insurance companies doing business in the state are under the supervision of 3 commissioners. There are 90 banks in the state; of these 38 are in the city of Providence, with an aggregate capital of \$15,590,450; in other parts of the state 52, with a capital of \$5,632,279; total capital, all paid in, \$21,151,879. The following is from the returns made on July 1, 1861. Bills in circulation, \$3,038,767; deposits, \$3,490,883; debts due to other banks, \$1,023,757. Resources: loans, \$26,370,112; specie, \$625,552; bills of other banks and deposits in other banks, \$2,124,237; real estate, \$613,747; other property, \$140,548. There is always a large amount on deposit in New York, which is considered equivalent to specie. For several years these banks have paid an average annual dividend of 7½ per cent. Their losses have been small. There are in the state 21 institutions for savings, having deposits at the close of the year 1860 to the amount of \$9,163,760, belonging to 35,405 depositors, or an average of about \$259 to each depositor.—There are 240 churches in the state, in which almost all forms of religious belief are represented. There are church accommodations for about 110,000 persons, and the value

of church property is about \$1,300,000. The Baptists are the most numerous, having nearly one half the whole number. The Episcopalians and Roman Catholics have both increased more rapidly than any other sects during the last 10 years. The Congregationalists and Methodists have each about 25 churches. There is one Jewish synagogue in Newport, and, under a legacy made by the late Judah Touro of New Orleans, services are held therein at stated periods, although there is no resident Jewish population. There is a small Hebrew congregation in Providence. The public schools of the state are in a flourishing condition. The number of school districts is 886, and of school houses 400; number of scholars attending summer schools, according to the returns of the commissioner in Jan. 1861, 24,726; average attendance 20,004; number attending winter schools 27,750, average attendance 21,691; number of male teachers in summer schools 100, of female 470; in winter schools, 238 male and 357 female. The state has a permanent school fund, actually invested in bank and city stocks, of \$245,100. The interest of the state's part of the United States surplus revenue (known as the U. S. deposit fund), together with the proceeds of the militia commutation tax, and the tax received from auctioneers, are appropriated to the public schools. The amount appropriated in 1860 by the state was \$49,996.86; amount raised by town taxes, \$95,872.51; registry taxes, \$11,538.59; rate bills, \$6,881.02; balance from last year, \$4,125.23; making the total amount from all sources \$168,365.21. Of this sum there was expended on school houses \$34,729.38. A state normal school was established in Providence in 1854, but has since been removed to Bristol. There are no public academies in the state, but many excellent private ones. The high school in Providence, supported by the city, is of this character. At this institution and at the grammar schools young men are prepared for college. The only college in the state is Brown university, in Providence. (See BROWN UNIVERSITY.) There are in the state 4 daily and 17 weekly and semi-weekly newspapers; 3 of the former and 9 of the latter are in Providence. The oldest is the "Newport Mercury," which originated in 1758, and is still continued.—The Rhode Island state prison is in Providence. The number of convicts in it, Jan. 1, 1860, was 67; committed during that year, 29; total to Jan. 1, 1861, 96. Its income in 1860 was \$16,072.29; expenses, \$13,489; actual profit to the state from convicts' labor, \$2,817.88. The labor of the convicts is let to contractors at 40 cents a day. The charitable and reformatory institutions are in or near the city of Providence. The most important of these is the Butler hospital for the insane, which is well endowed, has fine buildings and spacious grounds, and can accommodate about 145 patients. The state makes an appropriation of \$1,500 per annum to enable the governor to aid poor insane per-

sons placed here, and it also pays a portion of the expenses of such poor insane as the towns may send. The Dexter asylum for the poor, belonging to Providence, is also a spacious edifice of brick surrounded by extensive grounds, the gift of the late Knight Dexter. There are no institutions in the state for the deaf, dumb, blind, and idiotic, but ample provision is made for their support and education at institutions in Massachusetts and Connecticut; 25 beneficiaries now receive aid from the state at these institutions. The reform school in Providence, established in 1850, is for juvenile delinquents, of whom 831 were committed from its foundation to the end of the year 1859; the usual number in the school is from 175 to 200. The inmates are chiefly employed in making articles required in the institution, while other goods are sold. The state contributes toward the support of juvenile delinquents placed here. There is also a Catholic orphan asylum in Providence, and in Cranston, just below the city limits, a large building is nearly finished for the education of Catholic boys.—The state has an excellent system of returns of births, marriages, and deaths. According to the registration report for the year ending Dec. 31, 1859 (the last published), the number of births was 4,324 (males 2,209, females 2,097, 17 sex unknown). Of these, 2,020 were of American parentage, 1,990 of foreign, and 286 of mixed. Number of marriages, 1,572, of which 1,017 were between Americans, 508 between foreigners, and 136 between Americans and foreigners. Whole number of deaths, 2,270 (1,148 males, 1,121 females); of these, 1,378 were Americans and 825 foreigners. The average age of all the deaths was 31.39 years; of the males 30.45 years, of the females 32.84 years.—The government of the state is vested in a general assembly consisting of a senate and house of representatives, a governor (salary \$1,000), lieutenant-governor (\$250), secretary of state (\$1,000 and fees), attorney-general (\$1,200 and fees), and treasurer (\$800). They are all elected annually in April. The senate consists of the governor, who presides, the lieutenant-governor, and one member from each city and town in the state. The house of representatives cannot exceed 72 members, and consists of one for every 2,200 inhabitants of every town and city, and one additional member for every fraction of every town and city exceeding one half the ratio mentioned; but each town is entitled to at least one representative, and none can have more than 12; the latter number is sent by the city of Providence. The pay of the members is \$1 a day and 8 cents for every mile travelled. The general assembly holds its regular session in Newport commencing the last Tuesday in May, and a session, by adjournment, at Providence in January following. The pardoning power is vested exclusively in the governor, with the advice and consent of the senate. The judicial power is vested in a supreme court and such inferior courts as the general assem-

bly shall from time to time establish. The supreme court consists of a chief justice, with a salary of \$2,500, and 3 associate justices with salaries of \$1,800 each; they are elected by the general assembly, and hold office until removed by a resolution of both houses. The court of common pleas in each of the 5 counties is held by a single judge of the supreme court. In Providence, Newport, and Woonsocket are magistrates' courts, the justices for which are elected by the general assembly, and hold their offices for one year. All citizens of the United States, native or naturalized, without regard to color, possessed of a freehold of \$134, or renting for \$7 per annum, and all native citizens, without regard to color, paying either a property tax of \$1 or a voluntary registry tax of \$1, who have resided in the state 2 years, and 6 months in the town in which they offer to vote, are legally authorized voters. The finances of the state for the year ending April 1, 1861, were as follows. Receipts: state tax, \$66,671.94; bank tax, \$87,559.30; institutions for savings, \$11,893.47; insurance companies, \$7,180.35; from courts, \$11,079.47; peddlers' licenses, \$2,800; interest on stocks, \$15,340.08; all other sources, \$6,005.41. Expenditures: salaries, \$19,167.92; general assembly, \$8,434.81; courts, \$36,252.92; printing, \$3,354.97; public schools, \$49,996.86; militia, \$14,289.26; reform school, \$9,800.56; the support of the insane, indigent blind, deaf, dumb, and idiotic, \$14,088.98; all other expenditures \$30,040.46. Total receipts, \$208,570.12; total payments, \$235,797.35; excess of payments, \$27,227.23. The valuation of ratable property is as follows: Providence co., \$85,529,093; Newport co., \$17,788,466; Washington co., \$8,629,048; Bristol co., \$6,622,680; Kent co., \$8,629,048; total state valuation, \$126,579,376. The valuation of the city of Providence is \$66,526,200; of Newport, \$10,484,400.—The Icelandic sagas, or ancient historical relations, show that America was visited by the Northmen as early as the 10th and the following centuries; that they established themselves upon the shores of a fine bay, and called the country Vinland, from the abundance of wild grapes found there. Geographers have recently fixed upon Rhode Island as the ancient Vinland; indeed, if reliance is to be placed on these sagas, a critical examination of them leads to this result. In 1524 Verazzano, coasting eastward from a bay which has been identified as that of New York, passed up an opening into a large bay where he remained a fortnight. There is little doubt that this was Narraganset bay, and that he first came to anchor in Newport harbor. He held a friendly intercourse with the natives, who visited his vessel in great numbers. The country was then very thickly populated. Many believe that the "old stone mill," an interesting ruin in Newport, long the puzzle of antiquaries, is the work of some of the early European navigators who followed Verazzano, while the Danish antiquaries claim it as a work

of the Northmen. It was used for a grist mill by the settlers who accompanied Williams and Coddington to Rhode Island, and may have been erected by them for that purpose. The celebrated Dighton rock, on Taunton river, a few miles from Mount Hope bay, bearing a variety of strange figures, has been claimed by the Danish antiquaries as a memorial of the visit of the ancient Northmen under Thorfin in the 10th century. They have even gone so far as to attempt to trace out the name of this hero among the rude sculptures on the rock.—Rhode Island was first settled at Providence in the year 1636 by Roger Williams, who had been banished from Massachusetts for maintaining opinions in political and religious matters at variance with those of the rulers in that colony. He left Salem suddenly in the winter, to avoid being sent to England, and after remaining several months with the Indians he crossed Seekonk river in a log canoe with 5 associates, sailed around to Providence river, and fixed his habitation on the spot where Providence now stands. This was so called by Williams in grateful acknowledgment of "God's merciful providence to him in his distress." It was here that Williams first proclaimed the doctrine that magistrates and other civil rulers have no authority to prescribe, enjoin, or regulate religious belief. A year after he was followed by William Coddington and 18 others, who were also persecuted and forced to leave Massachusetts for religious opinions, deemed to be heresies there. By the advice of Williams, Coddington and his associates purchased from the Indians the island of Aquetneck, afterward called Rhode island, and took up their residence there. Their compact, the original of which is preserved in the secretary of state's office at Providence, bears date the 7th day of the 1st month (March), 1638, and is signed by the whole party. Coddington was chosen chief magistrate, and by pursuing the same policy as that of the settlers of Providence, he induced a large number of emigrants from the colonies of Plymouth and Massachusetts Bay to come among them. A third settlement was formed at Warwick in 1642, by a party among which John Greene and Samuel Gorton were prominent. Portsmouth, adjoining Newport, was settled by Coddington's party at the same time with Newport. In 1642 Williams went to England, and in the following year obtained a patent for the united government of Providence, Newport, and Portsmouth. This patent, which bears date March 14, 1643, was not accepted until 1647. It continued in force until 1663, when John Clark, who was sent by the colony to England for the purpose, obtained from Charles II. a new charter, incorporating the colony of "Rhode Island and Providence Plantations." This charter continued in force, and was the only constitution of the state, for 179 years. In 1842, after much popular excitement, attended by an insurrection in which Thomas Wilson Dorr was the leader, the present con-



stitution was adopted. The great war between the English settlers and the Indian tribes of New England broke out in June, 1675. Rhode Island suffered severely from it. Many towns, villages, and farm houses were burned, and families butchered. Providence, among others, was burned. The war only terminated with the death of Philip, king of the Wampanoags, a powerful tribe which dwelt on the eastern shore of Narraganset bay. This celebrated sachem was killed in Aug. 1676, in a swamp near Mt. Hope, on Narraganset bay. But the great contest in this war, and which decided the fate of the Indians, took place in December previous in the "Narraganset country," so called, in the S. part of the state, the seat of the great and powerful tribe of Narragansets. Here the Indians had collected in great numbers and fortified themselves, on a rising ground in the centre of a dense swamp. Palisades, breastworks, and a blockhouse further protected them. The force sent to oppose the Indians consisted of 13 companies of infantry and one of cavalry, from the colonies of Massachusetts and Connecticut, under the command of Gov. Winslow, of Plymouth. Rhode Island was opposed to this exterminating war, and was not even consulted in regard to it by the other colonies. The Indians were totally defeated, with a loss in killed, wounded, and prisoners of not less than 1,000, of whom 300 perished in the flames. The colonists lost from 200 to 400, including many superior officers. In Jan. 1686-'7, Sir Edmund Andros, having been commissioned as governor of New England, New York, &c., abrogated the charter of Rhode Island, with those of other colonies, which then became a mere county, governed by civil officers appointed by him. The revolution breaking out in England in 1688, Andros was seized in Boston, together with his council, and after remaining some months in prison was sent to England. In Feb. 1689-'90, the general assembly again met and reorganized the government under the charter. Rhode Island took a prominent part in the great struggle between Great Britain and France for empire in America. She furnished large numbers of troops for the expeditions against Louisburg, Cape Breton, Crown Point, Oswego, and Canada; but it was at sea that she rendered the most important service. In 1756 she had 50 privateers at sea manned by upward of 1,500 men. These private men-of-war cruised along the coast and among the West India islands, where they made many captures. In the war of the revolution she also rendered important service by sea as well as on land. The first naval squadron sent against the enemy was fitted out and sailed from Providence under command of Commodore Hopkins, who was styled admiral. Paul Jones, afterward so celebrated, was a lieutenant in this fleet. Commodores Whipple and Talbot, whose deeds are prominent in the naval history of the period, also sailed from and belonged to Rhode Island. Major-General Nathanael

Greene, who distinguished himself chiefly in the southern campaigns, was a native of and began his military career in this state. In Dec. 1776, Rhode Island was invaded by the British under Gen. Sir Henry Clinton, who occupied Newport several years. Gen. Sullivan, aided by a French fleet under Count de Grasse, made several unsuccessful attempts to dislodge the enemy, and in the autumn of 1778 laid siege to Newport, but was finally obliged to abandon the project. Toward the close of 1779 the British troops were withdrawn, and the following year Rochambeau arrived with 6,000 French auxiliaries. Rhode Island was the last of the 13 colonies that adopted the constitution of the United States, and was admitted to the Union on May 29, 1790. In the war with Great Britain in 1812 the state was made conspicuous by the victory on Lake Erie of Commodore O. H. Perry, a native of this state, won by the aid of a party of seamen and shipwrights from Rhode Island. In the civil war of 1860-'61, she sent off a body of troops for the defence of Washington 3 days after President Lincoln had issued his proclamation calling upon the states for troops. In the battle of Bull Run on July 21, her two regiments and the governor of the state took part.

RHODES (ancient and modern Gr. *Rhodos*, from *ῥόδον*, a rose), an island belonging to Turkey in the Mediterranean, off the S. W. coast of Asia Minor, from which it is separated by a channel 10 m. wide. It is between lat. 35° 53' and 36° 28' N. and long. 27° 40' and 28° 12' E.; area, about 420 sq. m.; pop. 28,000, of whom 21,000 are Greeks, 6,000 Turks, and 1,000 Jews, all of the two latter nationalities residing in the capital. There are also a few hundred Franks or Europeans. It is ruled by a pasha, who holds his office for life, governing also the adjoining islands belonging to Turkey, and who farms the revenues, paying an annual sum of half a million piasters to the Porte, beside fitting out a frigate every 2 or 3 years. It is the seat of an archbishop of the Greek church. The island is divided lengthwise by a mountain chain or ridge from which a number of small rivers flow down, the most considerable of which is the Fisco. Some cotton is grown, and a tract of low hills next to this coast district still produces the perfumed wine for which the island was once celebrated. The loftiest summit of the mountain ridge that divides the island is Artemira, 4,068 feet high. The exports for the year 1855 amounted to \$65,000, and consisted of wine, figs, oranges, lemons, sponges, shoes, and red leather. The imports amounted to \$400,000, and consisted in a large degree of manufactures.—RHODES, the chief city and capital, is situated upon the N. E. coast; pop. 10,000, of whom about 6,000 are Turks, 1,000 Jews, and the residue Greeks. It is built in the form of an amphitheatre upon a bay between the cape of the Mills and Cape Camburno. It is surrounded by ancient walls and towers built by the knights of St. John. There are two harbors, separated by a narrow quay.

The former palace of the grand master, now the residence of the pasha, is a large and handsome building and commands the city; it was much injured by an earthquake in 1856. The once magnificent church of St. John is now in partial ruin, and forms a Turkish mosque. There are no considerable remains of an earlier time than the residence of the knights of St. John. They have left a moated castle of great size and strength, containing the cloisters of the knights. The city of Rhodes is described by Strabo as superior to all other cities for the beauty and convenience of its ports, streets, walls, and public edifices, all of them profusely adorned with works of art. There are said to have been about 3,000 statues in the city. It contained one of the 7 wonders of the ancient world in its brazen statue of Apollo, commonly called the colossus of Rhodes. (See Colossus.)—The earliest historical inhabitants of Rhodes were of Doric race, and the three most ancient towns of the island, Lindus, Ialysus, and Camirus, formed, together with Cos, Cnidus, and Halicarnassus on the mainland, the confederation called the Doric hexapolis. At a remote period Rhodes was populous and prosperous, and sent forth colonies to Spain, Italy, and Sicily, as well as to the coasts of Asia Minor. The island, however, did not take a prominent position among the Grecian states till 408 B. C., when the three cities before named joined together in building the city of Rhodes, which thenceforth became the capital. The island fell under the dominion of Alexander the Great, but after his death the Macedonian garrison was expelled, and Rhodes entered upon the most glorious epoch of her history, during which her power was admitted by all the surrounding nations, and her dominion established over a portion of the adjacent coasts of Asia Minor. The Rhodians entered actively into the civil wars of Rome, and their adhesion to the party of Cæsar was severely punished by Cassius, who captured and plundered the city of Rhodes in 42 B. C. From this period the island rapidly declined in political power, though it long continued to be famous as a seat of learning. It was finally deprived of its independence by the emperor Claudius. Upon the ruin of the empire of the East the island fell successively into the hands of the caliphs, the crusaders, and the Genoese; and in 1309 the knights of St. John of Jerusalem, who had been compelled to evacuate Palestine, landed at Rhodes, and under the grand master Foulque de Villaret vanquished the Saracens and Greeks in several encounters, and made themselves masters of the city and the island. The knights held the place for two centuries, and in 1522 Sultan Solymán the Magnificent advanced against it with an army numbering upward of 200,000. There was on the island to oppose this only a force of 6,000, headed by the grand master Villiers de l'Isle-Adam. After a siege that lasted through the whole summer, almost innumerable assaults, and a most

heroic defence, the city capitulated in Oct. 1522, and has ever since remained under its present masters. The surviving defenders were allowed to leave the island. (See St. JOHN, KNIGHTS OF.)

**RHODIUM**, one of the metals found in connection with platinum and separated in the chemical preparation of this metal. It was discovered in 1803 by Wollaston, who called it rhodium in allusion to the red color of its solutions. He found its specific gravity to be 11; but MM. Deville and Debray, in their recent paper "On some Properties of the so called Platinum Metals," give to it a density of 12.1. It resembles aluminum in appearance, is of extreme hardness, and more infusible than platinum, and is not volatilized, but oxidizes on the surface like palladium. By itself it is insoluble in any acid; but when alloyed with platinum, copper, bismuth, or lead, the rhodium dissolves with the other metals. This is not the case, however, when it is alloyed with gold or silver. Solutions are readily obtained by mixing the metal finely pulverized with chloride of potassium or sodium, and heating the mixture to dull red heat in a stream of chlorine gas. Deville and Debray separate the pure metal by the following method. Platinum residues are melted with an equal weight of lead and twice their weight of litharge. The metallic button obtained, being treated with dilute nitric acid, gives up the lead, copper, and palladium. The residue, mixed with exactly 5 times its weight of binoxide of barium, is heated to redness for an hour or two in a clay crucible. The osmic acid is then removed by water, followed by aqua regia, and the baryta is precipitated by sulphuric acid. A little nitric acid is added to the solution, then sal ammoniac in great excess, and it is then boiled, filtered, and evaporated to dryness at 212°. The rhodium is then removed by washing with concentrated solution of sal ammoniac, and nitric acid being added to take up the ammonia the rhodium salt is left behind on evaporation. This is moistened with hydrosulphuret of ammonium mixed with 3 or 4 times its weight of sulphur, and being heated to redness in a crucible, metallic rhodium is found in the bottom. Other methods of treatment are described by Prof. Wolcott Gibbs in "Researches on the Platinum Metals," a paper published in vol. xii. of the "Smithsonian Contributions to Knowledge."

**RHODODENDRON** (Gr. *ῥόδον*, the rose, and *δένδρον*, a tree), a genus of evergreen shrubs belonging to the natural order *Ericaceæ*, and distinguished in gardening for their superb flowers. The generic characters are: a 5-parted calyx; a 5-lobed, bell-shaped or partly funnel-shaped corolla; 10 stamens, commonly declinate, with short, 2-celled anthers; a declined style; a 5-parted, 5-valved, many-seeded pod, the seeds minute and scaly. David Don ("Edinburgh Philosophical Journal," 1822) has endeavored to show that in no essential particulars does the genus differ from *azalea* and *rhodora*

of Linnæus; and Dr. Torrey in his "Flora of the United States," and subsequently in his "Flora of the State of New York" (Albany, 1843), adopts the same view. Professor Gray, however, in his "Manual of Botany" (2d ed., New York, 1856), adheres to the original arrangement. The deciduous foliage of the azaleas and rhodora, and the usual number of only 5 stamens in the former, together with the deeply divided and irregularly segmented corolla of the latter, certainly point out very natural distinctions; but the facility with which a great number of hybrids fertile in themselves and capable of originating sub-varieties have been originated by cross impregnation between species in each of the 3 genera, offers arguments for the correctness of Don's judgment. In this article the Linnæan idea is followed, based in regard to the rhododendron on the coriaceous, evergreen character of the foliage.—The earliest known species, and one most familiar to botanists, is the Pontic rhododendron, or rosebay (*rhododendron Ponticum*, Linn.), an evergreen shrub, native of Armenia, where it grows to the height of 10 or 12 feet, flowering in May and June. Its leaves are oblong lanceolate, smooth on both sides, narrower toward the thick petioles; the flowers are borne in short corymbose racemes; the calyx minute, 5-toothed, somewhat cartilaginous; the corolla large, purple, with ovate, acute, lanceolate segments. This species was at one time the most common in gardens, being a favorite shrub in British floriculture. In most parts of the United States it proves too tender and requires protection in winter. One or two wild varieties are known, and several garden varieties and sub-varieties. The species was familiar to the ancients, from whom the generic name has been derived. Bees feeding on its flowers were supposed to produce poisonous honey; but other plants were probably the originators of the mischief. The yellow rhododendron (*R. chrysanthum*, Linn.) is a native of Siberia, on the highest mountains, and of the Caucasus, forming a low evergreen bush. Its leaves are acutish, attenuated at base, oblong, glabrous, reticulately veined, and of a rusty color beneath; the flowers and buds clothed with a rusty tomentum, pedicels hairy; calyx almost wanting; flower handsome, large, with the segments of the corolla rounded, yellow. The Caucasian rosebay (*R. Caucasicum*, Pallas) has a creeping root, procumbent branches, and ovate-oblong leaves, rusty beneath, rough and green above; flowers in umbellate corymbs, corolla purple or white, rotate, with wavy rounded segments. The rusty rosebay (*R. ferrugineum*, Linn.) grows only a foot high, with leaves like that of the box, and when young clothed with a few hairs at bottom; flowers of a beautiful rose color or scarlet marked with ash-colored or yellowish dots; a white-flowered variety is known. It is an alpine species of Europe, especially of Switzerland, Austria, Savoy, &c. A very similar species to and a companion of the last is

the hairy rosebay (*R. hirsutum*, Linn.), a shrub 1 or 2 feet high, with pale red or scarlet flowers, ovate, lanceolate, or elliptic acute leaves margined with rusty cilia, smooth above, dotted and hairy beneath; there is a variety with leaves edged with yellow. A small, stiff, much branched species, indigenous to Nepaul, has branchlets beset with small bristles, oval, mucronate leaves, bristly on the margins and under surfaces, pedicels beset with glandular hairs, flowers purple and the calyx of the same color. The booram or tree rosebay (*R. arboreum*, Smith) is a superb species, growing 20 feet high, with lanceolate, acute leaves, which are silvery beneath and 4 to 6 inches long; flowers in dense heads, large, scarlet dotted with black on the upper limb of the corolla inside. It occurs on the highest mountains of Nepaul. The tree is very showy when in blossom. There is also a variety with white blossoms, and others so closely allied as to be considered variations of form owing to soil or situation. The bell-flowered rosebay (*R. campanulatum*, D. Don) has elliptic, oblong, mucronate leaves, rusty beneath, rather cordate at base, flowers copious, disposed in corymbose clusters, and corolla large, pale pink changing to white, having the upper lip marked with irregular purple spots. It grows on the high mountains of Nepaul. The bearded rosebay (*R. anthopogon*, D. Don) has a sulphur-colored, salver-shaped corolla, with a cylindrical tube and spreading limb, the throat woolly; it occurs in the same locality with the last. The ground cistus rosebay (*R. chamæcistus*, Linn.) is only a dwarf tufted shrub with small leaves attenuated at both ends and oblong lanceolate; flowers with rotate corals, pale purple. It grows on the European Alps and in eastern Siberia.—The North American species are the great rosebay or great laurel (*R. maximum*, Linn.), a large, straggling shrub, of a very irregular mode of growth, the bark grayish, cracked and broken, the leaves in tufts at the ends of the branches, coriaceous on round thick petioles, oblong entire, revolute on the edges, pale underneath; a light woolly substance covers the young leaves; the flowers are in a terminal cluster, the unexpanded bud resembling a cone; as each flower expands, a rhomboidal bract falls from beneath it, revealing a small calyx of 5 unequal segments, a monopetalous, funnel-shaped corolla, the tube short, the border divided in 5 unequal segments; the color of a beautiful rose, with orange-colored spots on the centre of the upper limb. The species delights in shady woods and cold swamps, and is found in various parts of New England, New York, Ohio, and along shady water courses in the mountains of Pennsylvania and southward. It succeeds well under cultivation, and is as hardy as it is ornamental. Two native varieties are described by Pursh, one with white flowers smaller than those of the *maximum* and differently formed leaves, dependent probably on the nature of its habitat, the other with purple

blossoms occurring on the highest mountains of Virginia and Carolina. This latter grows to a great size, its stem reaching to the height of 25 feet and a diameter of 18 inches, with very large and broad leaves. The dotted-leaved rosebay (*R. punctatum*, Andrews) is an elegant shrub, growing 4 feet high, with oval-lanceolate leaves, acute at both ends, smooth, beset with rusty resinous dots beneath, the flowers pink, calycine teeth short, the segments of the corolla ovate, a little undulated, and the capsules elongated. It occurs abundantly along the head waters of the rivers of Georgia and Carolina. A superb-flowered species with umbellate corymbs of broadly belled, lilac purple blossoms, oval oblong, smooth leaves rounded at both ends, pale beneath, is the *R. Catawbiense* of Michaux, occurring on the high summits of the Alleghenies in Virginia and southward; and the Lapland rosebay (*R. Lapponicum*, Wahl.), occurring on the alpine summits of the high mountains of New England and New York, as well as in the arctic regions of Europe and Asia, is a little dwarf species with elliptical obtuse leaves, with rusty scales and dotted on both sides, the flowers 5 to 6, disposed in umbellate corymbs, the calyx covered with yellow scales, the corollas of a violet purple.—The total number of evergreen and persistent-leaved rosebays, according to G. Don, is 26 species, while the *Hortus Britannicus* enumerates 33. Their geographical range seems to be that of the colder swamps or the highest summits of the mountains of Europe, Asia, and North America. In gardening, and more particularly in floriculture, the rhododendron has received the most marked attention. Many varieties were at first raised from the Pontic, such as the white-flowered, the twisted-petalled, the double-flowered, the rubescent-flowered, the narrow-leaved, the silver-leaved, the golden-leaved, the long-leaved, the willow-leaved, &c.; but in all these a certain stiffness in the form and a light or purplish color of the flowers prevailed. Experiments were instituted in cross impregnation, using the pollen dust of the Asiatic upon the stigmata of the European, and impregnating the latter with the American. By these means seedlings with better shape, handsomer foliage, more graceful corollas, and richer colors of flowers were obtained. These hybrid seedlings were in turn tried; and the crimson tree rhododendron was used to impregnate a *Ponticum-Catawbiense*, giving rise to the gorgeous *altacelerense*, at one time considered the finest variety in existence. In the course of similar experiments the Hon. and Rev. William Herbert produced a hybrid which was described and figured in the "Botanical Register" (London), and had in his possession seedlings from a white-flowered azalea accidentally crossed by the dust of the Pontic rhododendron, and many seedling plants from a cross between two distinct species of both these genera. Until recently the materials in the hands of the hybridizer were limited, when the botanical discoveries of

Dr. Joseph D. Hooker in Sikkim-Himalaya gave a new impetus in this direction. Many entirely new species were detected and their seeds secured, which being liberally distributed among cultivators in Great Britain were successfully raised, and several having flowers proved themselves superior even to their representations in the full-sized colored engravings of Hooker's "Rhododendrons of the Sikkim-Himalaya." In these a greater size of foliage, finely formed corollas, and attractive colors, even to shades of yellow, were noticeable. The opportunity thus afforded to produce novelties in floriculture has opened a new field of enterprise, and the successful impregnation of a co-species which has fragrance with hardier and scentless kinds, gives promise that the last charm attendant on these plants may be looked for.—The rhododendrons delight in a cool and moist soil and in a partial shade. The best time for transplanting is previous to the opening of their leaf buds, though well established plants can be lifted at other times. The soil about them should be renovated occasionally by new and fresh mould, or even by top dressings of old decayed manures. In the northern United States the great rosebay (*R. maximum*) will alone endure the winters; and the others, which are cultivated in tubs and pots, require the same care as similar woody ericaceous plants. All the species are propagated readily from seeds, but the young seedlings are so small and tender that for a year or two extra pains are to be taken with them. Layering is sometimes used, and cuttings of half-ripened shoots planted in sand and plunged in a gentle bottom heat will grow. To insure an early flowering, the choicer varieties may be grafted upon the more common and hardier; the requisites to success being healthy stocks and a close, warm, moist atmosphere while the union is in progress. Some instances have been known in Europe where the stem under cultivation has attained an altitude of 16 feet; and in the swamps of eastern New England, the great rosebay may be seen still taller and larger.

RHODOPE. See THRACE.

RHÔNE, a S. E. department of France, formed from the old province of Lyonnais, bounded N. by Saône-et-Loire, E. by Ain and Isère, and S. and W. by Loire; area, 1,066 sq. m.; pop. in 1856, 625,991. The surface is mountainous, the department being traversed in a N. and S. direction by the Cévennes. Mont Tarare, the highest summit, is 4,500 feet above the sea. The Rhône flows upon the E. boundary for a considerable distance, its most important tributary in the department being the Saône, while some small affluents of the Loire have their sources on the W. side of the mountains. The soil is not fertile, and only about one half of the surface is arable; the vine is the most important production, and some of the wines are of excellent quality. The department is distinguished for its manufactures, the silk fabrics of Lyons, the capital, being the most celebrated in Europe.

**RHÔNE**, a river of Europe, rising in the Swiss canton of Valais, not far from the sources of the Rhine, and flowing into the gulf of Lyons in the Mediterranean sea by two mouths, after a circuitous but general W. and S. course of about 580 m., 350 m. of which are in France. It originates in a glacier of the same name, situated at the Furca pass, about 5,904 feet above the sea, and traverses Valais in a W. direction as a mountain torrent till it enters the lake of Geneva near its E. extremity, where it has descended about 4,900 feet. In this part of its course it receives many small tributaries, the most important of which is the Dranse. When the Rhône enters the lake of Geneva its waters are exceedingly turbid; but on issuing from the S. W. extremity of that lake, the river is of a clear blue color, which, however, is changed to brown by the accession of the Arve, a muddy stream, about 1½ m. below the town of Geneva. It flows in a S. W. direction for about 15 m. till it enters France, when it turns S. through a narrow pass between the Alps and Mount Jura, forming the boundary line between the department of Ain and Savoy for nearly 40 m. A road which enters France through this pass in the mountain is commanded by Fort de l'Écluse with batteries hewn out of the solid rock. A little way below this place is the Perte du Rhône, where the river descends into a deep chasm partly covered over with massive fragments of rock. The Valsérine, a fine stream from Mount Jura, joins here from the right. At St. Genis, where the Rhône receives the Guiers from the S., it turns abruptly to the N. W. and afterward more to the W., till it reaches Lyons, receiving during this part of its course the Ain from the N. The river has now left the hilly region, and is joined at Lyons by the Saône from the N. The Rhône is here a considerable river, and flows almost due S. to Arles through a beautiful and fertile country, but the rapidity of the current and the shifting sands in its bed render the navigation dangerous and tedious. The most important tributaries which the Rhône receives in this part of its course, from the Cévennes on the right, are the Doux, Ardèche, Cèze, and Gard; and on the left, from the Alps, the Isère, Drome, Vigne, and Duranco. At Arles the river separates into two branches, the principal one, called the Grand Rhône, flowing S. E. to the sea, while the other, called the Petit Rhône, pursues a S. W. course, enclosing between them the deltoid island of Camargue. The Grand Rhône enters the gulf of Lyons below the Tour St. Louis, and has there commenced the formation of a new delta; and the Petit Rhône has its mouth a little way W. from the village of Saintes Maries. Both these mouths are so much obstructed by bars, that vessels from the Mediterranean enter the river by the Étang de Berre, a shore lake or lagoon to the E., which is connected with the Rhône by the Martigues canal, and by the Beaucaire canal, which leads from Arles to the lagoons

to the W. on the coasts of the departments of Gard and Hérault. Steamers sometimes ascend the Rhône as far as Seyssel, and by means of the Saône it is navigated to Châlon; while by canals it is connected with the Garonne, Seine, Loire, and Rhine. The Rhône is of great commercial importance, and below Lyons is navigated by numerous steamers. The Paris and Marseilles railroad runs along its left bank between Lyons and Arles; and in this part of its course the river passes many considerable towns, the principal of which are Vienne, Tournon, Valence, Avignon, Beaucaire, Tarascon, and Arles. Some of the finest wines of France are produced on the banks of the Rhône below Lyons.

**RHUBARB**, the root of the *rheum palatum*, and of other species of *rheum*, a genus of perennial herbaceous plants of the natural order *polygonaceæ*. From an unknown period the dried pulverized root was employed as a medicine in Asia; and from Arabia it is supposed that it was introduced into Europe. It is probably the *ῥα* of Dioscorides and the *ῥήνον* of Paulus Aegineta, and also the *racoma* of Pliny. The naturalists of Europe early endeavored to ascertain the exact species that produced the excellent kinds of rhubarb they procured through Russia and Turkey, and which was distinguished by the name of either one of these countries. Seeds and the plants themselves were brought at different times in the last century into western Europe from Tartary and the Himalaya mountains and other regions beyond the Bosphorus; but when cultivated the species obtained were various, and produced roots much inferior in their medicinal properties to the genuine rhubarb. So it is that up to the present time all attempts to determine the species which produces the true Turkey rhubarb have failed; it is supposed to have been brought from Tartary by caravans passing through Persia and Anatolia. To Russia the Tartarian rhubarb is brought by Bucharian merchants from the Chinese town of Si-nin, who deliver it at the frontier town of Kiakhta, where it is rigorously inspected by the agent of the Russian government. Every piece of the root is perforated to the centre in order to prove its soundness, and all the defective pieces are destroyed; those accepted are sent to St. Petersburg. The roots are of irregular shape, and appear to have been sliced on the surface with knives, probably for removing the bark, and they are marked with the large holes going partly through which were made for inspection. The taste of the rhubarb is a bitter astringent, and the smell aromatic; when chewed it crackles in the teeth from the presence of minute crystals of oxalate of lime that are clustered upon it, and it imparts a yellow color to the saliva. The best sorts are recognized by the bright yellow color of the powder, without any brownish tinge. On account of the superior quality of the Russian rhubarb it commands a high price, and to secure this other varieties

are made to imitate it as closely as may be. Most of the rhubarb that comes to the United States is from China, shipped from Canton. Some of this is very good, though still inferior to the Russian. The roots are more cylindrical and smoother as if scraped; they are not of so bright a color, and the powder has a reddish brown tinge. Defective pieces are mixed in with the best, and as all are usually powdered together the medicine must be of inferior efficacy. The Chinese sometimes attempt to give it the appearance of the Russian variety by cutting it into angular shapes, and filling up with powdered root, in order to conceal the little holes that have been made through the roots for suspending them on strings to dry. It is believed that both the Russian and Chinese come from the same region in Chinese Tartary around Si-nip; but there being in the Chinese market no such stringent regulations about the preparation of the drug, the inferior qualities are sent there. The plant is described by Mr. Bell, who saw it on his journey from St. Petersburg to Peking, as growing wild in a sandy soil. The roots are allowed to grow 6 years before they are sufficiently mature; and after they are dug much care is devoted to their preparation, which is chiefly drying, and he states that sometimes a whole year passes before the roots are ready for the market.—Other varieties of rhubarb are imported from England and France, where several species of the plant are cultivated, as also in Belgium and Germany. In general they are inferior to the Chinese, and they are chiefly used to adulterate the more valuable kinds. In England, the culture of the root has long been extensively practised at Banbury in Oxfordshire; and the species there grown is known as the *rheum Rhaponticum*. In France it is found that the *rheum palmatum*, originally obtained from Asia, and supposed to be the genuine rhubarb, degenerates so as to be worthless; and the species which are more profitable to cultivate are the *R. Rhaponticum*, *R. undulatum*, and *R. compactum*. Near Lorient in the department of Morbihan is the most important place of its cultivation, known on this account by the name of Rheumpole. The French drug is sometimes called rhapontic rhubarb and Crimea rhubarb. Other varieties are described as being produced in other countries, but they are not met with in commerce. The plant is cultivated not only for the sake of its root, but also for its leaf stalks, which from their succulence and agreeable acidity are used for making tarts and pies. In England their consumption for this purpose is very large, and the roots of the same plants are used for furnishing the drug. In the United States also the rhubarb, frequently called pie plant, is known as a very useful vegetable; but the root is entirely neglected. An imitation of champagne wine is prepared from the juice, which should however rather rank as a superior kind of cider than as a wine.—Rhubarb is adulterated not only by intermixture of inferior sorts, but worthless

pieces are disguised by staining them with ochre and with yellow turmeric. In this way rotten and worm-eaten roots, and the shavings trimmed from the Chinese preparatory to grinding, are concealed in the better sorts, and being pulverized with them seriously impair their efficacy. The chemical composition of rhubarb is very complicated, and chemists have failed to discover any peculiar principle in the drug to which its purgative property is owing. Brandes found in 100 parts of Chinese rhubarb 2 of pure rhubarbaric acid, 7.5 of the same impure, 2.5 of gallic acid, 9 of tannin, 3.5 of coloring extractive, 11 of uncrystallizable sugar with tannin, 4 of starch, 14.4 of gummy extractive, 4 of pectic acid, 1.1 of malate and gallate of lime, 11 of oxalate of lime, 1.5 of sulphate of potassa and chloride of potassium, 1 of silica, 0.5 of phosphate of lime and oxide of iron, 25 of lignin, and 2 of water. The analyses of Schlossberger and Döpping are still more elaborate, introducing a variety of new principles, among which the chrysophanic acid, resembling the rhubarbaric acid of Brandes, is the most interesting. It is a beautiful yellow substance, emitting yellow vapors when heated, soluble in alcohol, its alkaline solution of a beautiful red color, and those with potassa changing by evaporation to a violet and then to blue. Magnificent purples also are obtained from the yellow coloring matter produced by treating rhubarb with nitric acid and then with alkalis; and it has been proposed to apply these, called erythrose, in the arts as a dye stuff.—The medical properties of rhubarb are very peculiar. Its first effects upon the system are cathartic, and to these succeed an astringent action, checking the excessive operation of the purgative. The medicine is at the same time tonic and stomachic. As a purgative its action is moderate, and affects rather the muscular fibre than the secretory vessels. Its use is obviously indicated for relaxed conditions of the bowels, when the stomach is enfeebled, and a gentle cathartic is required, as in certain cases of dyspepsia, diarrhoea, dysentery, &c. It is much used in combination with magnesia, calomel, and other cathartics, when greater purgative action is required. This action may be reduced by roasting or long boiling. It is exhibited in powder, sometimes made into pills with soap, also in infusion, sirup, and tincture.

RIAZAN, RIASAN, or RIEZAN, a central government of European Russia, bounded N. by Vladimir, E. and S. by Tambov, and W. and N. W. by Tula and Moscow; area, 16,206 sq. m.; pop. in 1856, 1,394,077. The Don flows for a short distance in the S. W. part of the government, but the most important river is the Oka, which enters it in the N. The two rivers are connected by the Upa and the Ivanov canal. The soil is fertile in the S., but marshy in the N. There are extensive pastures; the principal products are grain, fruits, hops, and tobacco. The inhabitants are nearly all Russians, but there are a few Mordvins and Tartars. There



are manufactories of coarse linen and woollen goods and of glass and iron. Capital, Riazan; pop. about 15,000.

RIB. See SKELETON.

RIBAUT, JEAN, a French navigator, who led the first French colony to Florida, born in Dieppe, killed in Florida in 1565. During the reign of Charles IX. Admiral Coligni determined to found a French Huguenot colony in America, and made an experiment in Brazil, which ended unsuccessfully in consequence of the apostasy of the leader Villegagnon. The admiral, persevering in his project, obtained from the king a patent authorizing him to send an expedition to Florida, and two vessels suited for voyages of discovery were fitted out. In command of these was placed Ribault, who on Feb. 18, 1562, sailed from Havre de Grâce; and, leaving the beaten track so as not to touch at any of the islands held by the Spaniards, he came on April 30 in sight of land, probably part of Anastasia island on the coast of Florida. Sailing northward along the coast, he at last anchored in Port Royal harbor in the present state of South Carolina, and there determined to plant his colony. A fort was built, probably not far south of the present site of Beaufort, and named Carolina in honor of the king of France, and 26 colonists were left to keep possession of the country. Sailing from the port on June 11, Ribault found France distracted by a civil war; and while it lasted no aid could be procured for the new colony, the members of which, left to take care of themselves and improvident, were soon reduced to the point of starvation, and at last set sail for their native country in a crazy bark and were picked up by an English ship. After the dissensions had subsided in France, a new expedition under René de Laudonnière sailed in April, 1564, and made a settlement on the river May, now called the St. John's, and built a fort which they also called Carolina. In spite of the hospitable welcome of the natives, the colonists, receiving no supplies from home and having taken no pains to cultivate the soil, suffered so much from the scarcity of provisions, that they determined to return to France. Just as they were on the point of setting out, Ribault, who had sailed from Dieppe on May 22, 1565, arrived in command of a fleet of 7 vessels, with orders to supersede Laudonnière in the government of the colony. Scarcely had he anchored and communicated with those on shore, when, on Sept. 4, 5 Spanish vessels under Don Pedro Melendez de Aviles made their appearance. His name and objects were demanded. "I am Melendez of Spain," was the haughty answer, "sent with strict orders from my king to gibbet and behead all the Protestants in these regions. The Frenchman who is a Catholic I will spare; every heretic shall die." The French fleet was unprepared for battle and cut its cables; and the Spaniards after an ineffectual chase repaired to the harbor of St. Augustine. Against the advice of his officers,

especially Laudonnière, Ribault, instead of remaining at the settlement and improving the fortifications, determined to sail for St. Augustine and there attack the Spaniards. He had scarcely reached the open sea, when a terrible storm arose, by which his squadron, after being driven about by the winds for several days, was all wrecked on the coast of Florida not far from Cape Canaveral, and about 100 miles S. of St. Augustine. In the mean time Melendez passed over land through lakes, marshes, and forests, surprised the weak and almost defenceless garrison of Fort Carolina, and massacred nearly 200 of both sexes. Ignorant of the fate of those left behind, Ribault and more than 500 men, thrown without resources upon a desolate coast, set out for their fort, to reach which they were obliged to travel through an unknown country. They divided into two parties, the first of which, consisting of 200 men, went in advance of the others, and after coming within a few leagues of St. Augustine surrendered to Melendez at discretion. "Seeing that they were Lutherans," says Mendoza, the Spanish historian of the expedition, "the general condemned them all to death; but, as I was priest and had the bowels of a man, I besought him to accord to me the favor that he would not put to death those whom we should discover to be Christians. He granted my request. I made inquiry and found 10 or 12 whom we selected from the number. All the others were executed, because they were Lutherans, enemies of our holy Catholic faith." Ribault was with the second party, most of which not long afterward also fell into the hands of Melendez, who massacred nearly all of them, among them their commander, "not as Frenchmen, but as Lutherans." The French accounts state that their lives had been promised them in case they surrendered; but this is denied by the Spaniards. The French court paid no heed to this barbarous treatment of their own subjects; but Dominic de Gorgues, a Gascon soldier, burning with a desire to avenge the treatment of Ribault and his followers, sailed from France in 1567 at the head of a small force, with which he was successful in seizing upon two forts near the St. John's, and slaughtered nearly all the garrisons, and then captured the important fort of St. Mateo. The prisoners were all hanged upon the same tree upon which the French had been hanged by Melendez, and over them was placed the following inscription: "I do this not as unto Spaniards or mariners, but as unto traitors, robbers, and murderers." He then returned to France, but was coldly received by the French court, which disavowed his act, although he obtained the general applause of the people. In London a volume of 42 pages, now extremely rare, consisting of an English translation of the report of his first voyage made by Ribault to Coligni, was published under the title of "The whole and true Discoverie of Terra Florida (Englished the Florishing Land), con-

teynyng as well the wonderful straunge Natures and Maners of the People, with the merveyolous Commodities and Treasures of the Country; as also the pleasaunt Portes and Havens, and Wayes therunto never found out before the last year, 1562. Written in French, by Captain Ribauld, the fyrst that whollye discovered the same, and now newly set forth in Englishe, the xxx. of May, 1563."

RIBBON, or RIBAND (Fr. *ruban*), an ornamental narrow strip of woven silk, worn chiefly for ornament. The manufacture of ribbons, though not then new, first attained to any importance in France during the 17th century. They were variously ornamented with showy patterns, and about the year 1680 there was a rage for embossed ribbons, which were stamped with hot plates of steel, each piece having a portion of the pattern engraved upon it. Figured ribbons were made chiefly at Paris, but Lyons and Avignon were also largely engaged in the manufacture until after 1723, when the former had secured most of the trade. Before the revocation of the edict of Nantes there were about 3,000 ribbon looms in Tours; but that measure, which banished the Protestants, broke up the trade, and in Lyons also temporarily. In England ribbons are made mostly in Coventry, and with steam power looms. The material for the warp of the best ribbons is Italian organzine silk, thrown from Italian raw silk, and for inferior sorts organzine silk from Bengal and China. These last and Broussa in Asia Minor furnish the singles (all English thrown) for the shoot. The weaving is done as in other fabrics, and of late with the Jacquard machine. A fixed standard of widths is adopted, designated by different numbers of pence, which probably were the original prices, though now they have no such significance. From penny width to 40 penny width includes all ribbons from  $\frac{1}{4}$  inch to about  $\frac{1}{2}$  inches wide. The French designate them by numbers, running from 1 to 60. French and English make them of the same lengths—36 yards for satins, 18 yards for saracens or gauzes above the narrower widths, and 12 yards for the smaller sizes. French ribbons are generally lighter than the English, but they are made of better kinds of silk and better dressed. The varieties of ribbons are very numerous, as also the styles of ornamentation, which are continually changing. In the fancy ribbon called *chiné*, the figures are printed or painted on the warp after it is prepared for the loom, and afterward woven in by the shuttle. The watered effect is produced by passing two ribbons, laid one on the other, between two cylinders, one of them containing a heater within it. The irregular pressurè from the inequalities of the two surfaces of silk gives the wavy appearance. Galloons are strong thick ribbons used for bindings, shoe strings, &c. The wider ones are called doubles. Ribbon velvets are largely produced at Crefeld in Rhenish Prussia, and are also made at Spitalfields, England, and St. Etienne, France.

RIBBON FISH, the common name of several genera of acanthopterygian fishes of the family *taniidae*. They are characterized by a compressed, elongated, ensiform body, with very small or no scales; the bones are of loose texture, little more solid than a fibrous network; the eyes large, and teeth small or none; to this ribbon-like body is attached a dorsal commencing close to or upon the head, and completely furnished with membrane; the caudal when present is distinct from the perpendicular fins, and in some is set on at a right angle, like a fan extended upward; the ventrals are often wanting, or are placed beneath the pectorals. They are all marine species.—Among the genera having a protractile mouth with a small aperture belongs *stylephorus* (Shaw), having neither teeth, scales, nor ventrals, and the caudal standing upward, its last ray continuous with the tail and produced into a filament longer than the body. In *trachypterus* (Gouan) there are a few teeth, thoracic ventrals, a dorsal the whole length of the body, and an erect caudal; the northern ribbon fish or *raagmeer* (*T. bogmarus*, Val.), from the polar seas, attains a length of 3 or 4 feet, sometimes much more; the skin is covered with a silvery envelope like the shining covering of the choroid of the fish's eye, consisting of minute needle-shaped crystals (see "Annals and Magazine of Natural History," vol. iii., London, 1849); it looks like a silvery ribbon in the water; the lateral line is armed with hooked scales. Cuvier and Valenciennes describe 5 other species in vol. x. of their *Histoire naturelle des poissons*; of these the *T. falx* (Cuv.) of the Mediterranean has 168 rays on the dorsal and plumes of rays on the head and tail; the color is brilliant silvery, with large, round, black spots.—In the genus *gymnetrus* (Bloch) the ventrals are reduced to a single ray, very long and dilated at the end; the caudal is very small and continuous with the dorsal; of the 8 species, the best known is the ribbon fish of the Mediterranean (*G. gladius*, Val.), attaining a length of 6 or 8 feet; the rays of the dorsal over the head are elongated and curve backward like a crest; the silvery skin is studded with smooth osseous warts, and the fins are rosy red; like all the rest of the family, it is very easily broken, fitted for living in still deep waters, and is rarely seen except when thrown ashore after storms in a mutilated condition. The *G. Hauckeni* (Bloch) is occasionally seen on the English coasts, and with its narrow, long, and shining body, and sinuous movements, has been the basis of more than one story of the sea serpent.—In the genera with non-protractile mouth, with large gape and ascending lower jaw, belongs *lophotes* (Giorna); this has on the head a vertical corneous crest sustaining a strong spine, which is the first dorsal ray; the dorsal extends the whole length of the body and has numerous simple rays, the anal and caudal small, and the ventrals near the pectorals. The *L. Cepedianus* (Giorna) of the Mediterranean attains a

length of more than 4 feet, and is rarely seen. In *cepola* (Linn.) the body is covered with small scales; there is a single row of teeth in each jaw; the dorsal and anal are very long, and the caudal small. The red ribbon fish (*O. rubescens*, Linn.) occurs from the Mediterranean to the English coasts; it is about 18 inches long, of a brilliant red color, with indistinct dark bands, and the dorsal saffron yellow bordered with rose.

RIBERA, JOSÉ. See SPAGNOLETTO.

RICARDO, DAVID, an English political economist, of Jewish parentage, born in London, April 19, 1772, died at Gatecomb park, Gloucestershire, Sept. 11, 1823. His father was a native of Holland, and, having settled in England and become a member of the stock exchange, had realized a considerable fortune. The son received a commercial education in Holland, and was subsequently associated with his father in his business. He became a Christian, and in 1793 married against his father's wishes, wherefore the partnership was finally dissolved. Being assisted by some of the oldest members of the stock exchange, the younger Ricardo in a few years realized a fortune. He now studied mathematics, chemistry, and mineralogy, formed a laboratory and a mineralogical collection, and was one of the original promoters and members of the London geological society. He first appeared as an author in Sept. 1809, in a tract entitled "The High Price of Bullion a Proof of the Depreciation of Bank Notes." He afterward wrote various important works (see POLITICAL ECONOMY, vol. xiii. p. 452), and by these and as a member of parliament exerted much influence on legislation and on economical theories. His works with an account of his life have been collected and edited by J. R. McCulloch (8vo., London, 1846).

RICASOLI, BERTINO, an Italian statesman, born in Tuscany about 1805. He is the sole surviving male descendant of an ancient Lombard family, which took a leading part in the Florentine wars of the Guelphs and Ghibellines. In 1847 he produced a pamphlet on the political condition of Tuscany, urging the grand duke to grant the people representative institutions appropriate to the age. After the revolution of 1848 he was appointed *gonfaloniere* of Florence, and established a journal called *La patria*, in which he advocated a united Italian kingdom, free from the influence of Austria or the pope. He declined to take office under the republican government of 1849, and was one of the commissioners sent to recall the duke, after whose return he retired to his estates. He signed the manifesto which the revolutionary party published in April, 1859, as a declaration of war against the grand duke; and after the abdication of the latter he became minister of the interior in the cabinet appointed by Buoncompagni, commissioner for King Victor Emanuel, who had been proclaimed dictator of Tuscany. Upon the retirement of Buoncompagni, Ricasoli assumed temporarily the

functions of governor dictator, and in March, 1860, he was appointed governor-general, Prince Carignan at the same time assuming the office of viceroy. In June, 1861, he was appointed to succeed Count Cavour as president of the council and prime minister of the kingdom of Italy. In politics he advocates the union of the Italian race under one constitutional government, and since his elevation to the premiership has expressed himself in favor of recognizing Rome and Venice as portions of the national territory, and of "opening to the church a way of reform by giving her that liberty and independence which will invite her to regeneration." In religion he is said to be a Protestant.

RICAUT, or RYCAUT, SIR PAUL, an English diplomatist and author, the time and place of whose birth are unknown, died in London, Dec. 16, 1700. He was graduated at Cambridge in 1650, in 1661 accompanied the earl of Winchelsea as secretary of embassy to Constantinople, and during a residence of 8 years in Turkey made himself intimately acquainted with the manners and habits of the people. He was afterward British consul at Smyrna for 11 years, and after his return home accompanied the earl of Clarendon in 1685 to Ireland, holding various official positions there, and was for 10 years minister to the Hanse towns. He wrote "The Present State of the Ottoman Empire" (1668); the "Present State of the Greek and Armenian Churches" (1678); "History of the Turkish Empire from 1623 to 1679;" and translated Garcilasso de la Vega's "Royal Commentaries of Peru" (1688).

RICCIO, DOMENICO. See BRUSASORCI.

RICCIOLI, GIOVANNI BATTISTA, an Italian astronomer and geographer, born in Ferrara in 1599, died in Bologna in 1671. He was a member of the society of Jesus, taught philosophy, theology, and belles-lettres in the Jesuit colleges of Parma and Bologna, and finally devoted himself entirely to astronomy and geography. He undertook to refute Copernicus in the *Almagestum Norum* (2 vols. fol., Bologna, 1651), in which, however, he fairly explains his system, and expresses great admiration for his genius. His *Astronomia Reformata* (2 vols., 1665) is a completion of the former work, and both are still regarded as classics in astronomy for their full account of discoveries down to his own time, their valuable observations, especially upon the moon, historical table of eclipses from the time of Romulus, &c. He also published *Geographiæ et Hydrographiæ Reformatae Libri XIII.* (fol., 1661), containing all the data then extant upon latitudes and longitudes, including measurements of his own, and *Chronologia Reformata* (1669).

RICE (*oryza sativa*, natural order *gramineæ*), one of the cereals, most abundantly cultivated in warm climates for the food of man, and ranking next in importance for the proportion of the human family it supports to wheat. In the East Indies it has been cultivated from

time immemorial, so that nothing is known of its primitive condition or place. Dr. Roxburgh considers that the wild rice, known as *nivari* in Sanscrit, as *newaree* in Telinga, and as *aruz* in Arabic, is the parent of all the varieties. At the present time it is in some parts of India the chief article of produce, and in some districts, particularly in the marshy lands along the coast of Orissa, it is almost the only object of agricultural labor. In China and the islands of the eastern archipelago it is also a most important crop, and is the principal support of the vast population of that portion of the globe. It is extensively cultivated in parts of Africa, in southern Europe, in the tropical countries of North and South America, and as far N. as Virginia and Illinois. The plant was known to the ancient Greeks and Romans, and by Theophrastus was called *opuſov*, by Dioscorides *opuſa*, and by Pliny *oryza*. The species and varieties are almost innumerable, the multitude of conditions as to climate, soil, locality, cultivation, &c., under which it is grown, necessarily introducing numerous modifications of form, which are more or less permanent. Of the varieties known in Ceylon no fewer than 161 are enumerated in Moon's "Catalogue of Ceylon Plants."—In general rice grows like wheat, with a stalk about 4 feet long, which is rather more closely jointed than that of wheat, and with leaves like those of the leek. Several stems form at the top, bearing clusters of the grain resembling those of wheat, each terminated with a beard, and enclosed in a rough yellow husk. The seed within this is of elongated shape, of shining white color, and almost transparent. The stem of the common rice of the Carolinas is sometimes 6 feet in height. The plant is an annual, with subulate linear leaves, and flowers in a terminal panicle; leaflets of the calyx lanceolate; valves of the corolla equal in length, the outer ones twice as wide as the inner, 4-grooved, and awned; style single, 2-parted. It flourishes best in low marshy grounds which can be overflowed, and tide water swamps are particularly favorable for the crop. There is, however, another species, *oryza mutica*, which grows upon dry lands and the sides of mountains, and is largely cultivated in Ceylon and Java, and of late in Hungary. It has been introduced into France and other European countries, and is grown like barley or wheat. If laid under water the plant rots. The culm or stem is only about 3 feet high, and is more slender than that of common rice. The seed is long, with very long awns. At the great exhibition of 1851 curious samples and varieties of rice, possibly of this species, were displayed from the Himalaya, where they had been raised without irrigation at elevations of 3,000 to 4,000 feet. The rice raised in Virginia and sometimes in Maryland also is a dry or mountain rice cultivated in dry places, and known as the Cochin China. Its production hardly exceeds 15 or 20 bushels to the acre,

while the rice grown in the southern wet ground produces 20 to 60, and even in a few cases 90 bushels to the acre, the bushel weighing from 45 to 48 lbs. of clean rice. The first rice cultivated in the United States was in Virginia in 1647 by Sir William Berkeley, who from half a bushel of seed he had received raised the first year 16 bushels. In South Carolina, where the greatest success has been attained in the culture, and from whence the finest samples in the great exhibition were sent, the seed, it is said, was accidentally obtained from a vessel from Madagascar that put into Charleston in 1694. From this or from other sources the crops increased so rapidly, that in 1698 60 tons were shipped to England. In Louisiana the culture was introduced in 1718 by the "Company of the West." The following table presents the amounts of rice in the husk, known as rough rice or "paddy," raised in the several states in which the crop was cultivated in 1850:

States.	Lbs.	States.	Lbs.
South Carolina.....	152,930,613	Texas.....	83,203
Georgia.....	33,950,691	Arkansas.....	68,179
North Carolina.....	5,465,568	Virginia.....	17,154
Louisiana.....	4,423,849	Kentucky.....	6,685
Mississippi.....	2,719,556	Missouri.....	700
Alabama.....	2,812,252	Iowa.....	500
Florida.....	1,073,090		
Tennessee.....	253,454	Total.....	215,818,997

In South Carolina several varieties of the common rice are distinguished, of which the following are best known: 1. The common white rice, that of which the earliest crops consisted. The husk is white or cream-colored, and the grain not so large as that of the next variety. 2. Gold seed rice, the most esteemed and most generally cultivated of all. It was first planted on the Santee in 1785. The grain is  $\frac{3}{4}$  of an inch in length, slightly flattened on two sides, of a deep yellow or golden color; when the husk and inner coat are removed it presents a beautiful pearly white appearance, and somewhat translucent. 3. The white bearded rice, distinguished by its long awn or beard, the large size of the grain, and its growing well on high land. It has been considered a better crop for supplying the negroes than for exportation.—The best lands for the cultivation of rice are the alluvial swamps on the banks of rivers having a deep soil, chiefly of decomposed vegetable matters, and so situated as to be overflowed by the opening of tide gates at any high tide. They must be above the salt or brackish water, and below the reach of the freshets, so as not to be flooded at unseasonable times. Other low lands not in the tide region may bear good crops if so situated that they can be drained and flooded at will. The land is prepared by a thorough system of embankments and ditches, so laid out as to form several independent fields, the size of which is limited only by the number of hands that can be furnished, which must be sufficient to finish any one operation connected with the culture in one day; they usually consist of from 14 to 20 acres. The ditches are of various dimen-

sions, often 5 feet wide and as many deep, and sometimes the principal one is large enough to be used as a canal for transportation between the fields and the barns. Early in the winter the land is either ploughed or dug over with the hoe, and in the warm changes of the weather it is covered with water. In March it is kept dry, the drains are cleansed, the clods broken, and the surface smoothed off with the harrow or hoe, and trenches for the seed are made with a 4-inch trenching hoe at right angles with the drains 13 to 15 inches apart. In April and till the middle of May the seed is scattered in these trenches at the rate of 2½ to 3 bushels to the acre. Great attention is given to selecting the seed; and sometimes the rice for this purpose is threshed by hand over a log or barrel, so as to throw out only the full-sized grains. It is often the case that an inferior sort, called "volunteer" rice, the product of scattered seeds that have remained in the ground from the crop of the preceding year, is mixed with the good rice. These are known by their reddish color, and if there appear so many as one of them to the hundred of clean rice, the mixture is not considered fit for seed; and yet the only objection to the volunteer rice appears to be in its external color. As the seed is sown it is covered lightly with soil, and the water is then let in through the gates and kept upon the land for 4 to 6 days, till the grain swells and begins to sprout; or, by an improved method, the seed the day before sowing is daubed with clay by stirring it in clayey water, and being then dried enough clay adheres to insure its remaining in the trenches when the water is let on, even if not covered with earth. With the first method the water has to be let on a second time when the plants sprout and appear like needles above the ground, while with the latter one flooding answers. The water, after standing 4 to 6 days on the sprouts, is drained off, and when the plant is 5 or 6 weeks old the earth is stirred with the hoe; this is repeated 10 days afterward, and the "long water" is then put on for about 2 weeks, deep for 4 days, and then gradually diminishing. After the water has been drawn off about 8 days and the field is dry, it is hoed to a good depth. On the appearance of a joint in the plant the land is lightly hoed again, and is then "laid by," that is, the "joint water" is put on to remain until the grain is matured, which may be two months. A few days before cutting, the water is run off and the ditches are washed out by the succeeding tide. The rice is cut with a sickle, and is carefully laid across the high and thick stubble to cure. Each hand carries 3 or 4 rows, and his daily task is a quarter of an acre. The next day after cutting, when the dew is off, the rice is bound in sheaves, and either borne on the heads of the laborers or packed in large flats, each one carrying the product of 5 to 7 acres, to be conveyed to the barn yard. It is there stacked in small ricks, and when thoroughly cured it is

put away in large stacks, each of which holds enough to make 200 to 400 bushels of threshed grain. The routine of operations is somewhat varied on different plantations. The threshing is done in mills, the cost of which is from \$3,000 to \$7,000. The first one was imported from Scotland in 1811, and was run by the force of the wind, threshing and winnowing in favorable weather 500 bushels daily. An improved machine was contrived in 1829 by Calvin Emmons of New York, and is now generally in use, which separates the grain by the action of toothed beaters revolving at the rate of 750 to 800 turns per minute. From the threshing mills the grain is obtained in the condition of rough rice or paddy, which requires a further process of milling or grinding to free it from the hulls. It is however often shipped in this state, in which it is well protected against damage, and its preparation being completed in mills in Great Britain and on the continent, or in New York, the rice is delivered fresh and clean to the consumers. The old method of removing the hulls was by pounding in hand mortars made of pitch pine blocks and holding about a bushel. Each male laborer was provided with 8 pecks of rough rice, and each female with 2 pecks, to pound every morning before day, and the same at night after finishing the ordinary task in the field. The work was conducted on the floor of a large barn prepared for the purpose. Mills were first contrived between 1780 and 1790 by Mr. Jonathan Lucas, and his son of the same name improved them and brought them into general use. They were made to run by tide and recently by steam power, the latter costing from \$10,000 to \$18,000 each. One or the other kind is to be seen upon almost every rice plantation of 400 acres and upward. The earlier mills were constructed with pestles weighing over 250 lbs. each, shod with cast or sheet iron and beating into cast iron mortars of the capacity of 5 bushels each. These are still in use, and the rice is beaten for about 2 hours at the rate of about 45 strokes a minute. Others are constructed of stones, brought from Northumberland, England, between which the rice is rubbed without crushing the grain, and others have been made in which the work is done by wire cards. The larger mills receive rice on toll beside cleaning that belonging to their proprietors. From the mill the rice is passed through an inclined revolving cylindrical wire screen, the gratings of which grow coarser toward the lower end. It is thus assorted into a number of products. At the upper end of the screen the flour passes through, next the eyes and small pieces of broken rice, then the "middling rice," which consists of larger fragments and of the smaller grains, and lastly the "prime rice," or best and mostly unbroken grains. The head rice or largest grains of all, together with the rough that escaped the mill, pass out at the lower end and are thence returned to the mill. The prime rice as it falls

through the screen descends to the "polishing" or "brushing screen," which is a vertical cylinder, laid up and down with shreds of sheepskin, and made to revolve rapidly within a wire screen. The rice, falling down in the space between these, is swept clean of the flour that adheres to it, and is discharged below in a perfectly clean and polished condition. It is received in barrels holding about 6 cwt. each, and is then ready for the market. The middling and small rice, being cleaned by a fan, are kept for home consumption.—The chemical composition of Carolina rice was found by Braconnot to be as follows: starch 85.07 per cent., vegetable fibre 4.80, water 5, gluten 3.60, gum 0.71, uncrystallizable sugar 0.29, fixed oil 0.13, saline substances 0.40. Prof. C. U. Shepard found the ash of the clean rice, amounting to 0.497 in 100 parts, to consist of 73 per cent. of phosphate of lime, with traces of phosphate of magnesia, phosphate of potash nearly 5 per cent., and silica sometimes 20 per cent. Traces of sulphate of potassa, chloride of potassium, carbonate of lime, and carbonate of magnesia were also observed. The husk, commonly called chaff or offal, contains 97.55 per cent. of silica, together with small proportions of the several salts named.—As an article of food rice owes its value to the large amount of starch it contains, and to the gluten, which by other analyses beside Braconnot's has been found to amount to 7.5 per cent. It is moreover easily digested, and being entirely free from laxative properties is an excellent diet in warm climates, where a tendency to diarrhœa is common. It is from its composition evidently better adapted for use in such climates than in cold regions; for while it contains the most starch it is the most deficient in oil of all the cultivated grains. In flesh-producing elements it is far inferior to wheat or Indian corn, and is not half so rich as oats. In cookery it is used both whole and in flour. The common method of cooking the former is to boil it in water properly salted, the rice being introduced into the water after this is boiling hot. In 4 or 5 minutes the water is drained off, and the pot covered is left 20 minutes longer on the coals. The rice is then ready to be served up as a vegetable. It is also made into puddings, as is the ground rice. Of the latter are made varieties of bread and of griddle cakes. In medical practice a decoction known as rice water is often prescribed as a nutritive drink in fevers and inflammatory affections of the bowels, lungs, and kidneys. Its decoction fermented and distilled produces the spirituous liquor known as arrack. A useful cement is readily prepared from rice by mixing the flour with cold water and boiling. It dries nearly transparent, and is used in making many articles in paper. Made with little water it may be moulded into models, busts, &c. Although so rich in starch, it has not been found an economical material for supplying that article.

RICE, INDIAN, or WATER OATS, the seed of *zizania aquatica*, a common gramineous plant in the United States, growing in shallow water, and on the swampy borders of streams, most abundant in the N. W. states and in Canada. It produces a grain having some resemblance to rice, which is sometimes gathered by the Indians and used for food.

RICE, a S. E. co. of Minn., drained by the head waters of Cannon river; area, about 450 sq. m.; pop. in 1860, 7,543. It was formed from Wabashaw co. in 1852 or 1853, and has been since further reduced. Capital, Faribault.

RICE, LUTHER, an American clergyman and missionary, born in Northborough, Mass., March 25, 1783, died in Edgefield district, S. C., Sept. 25, 1836. He was graduated at Williams college in 1810, entered Andover theological seminary, and was one of the 5 students whose application to the general association of Massachusetts led to the formation of the American board of commissioners for foreign missions. On Feb. 6, 1812, with Messrs. Judson, Newell, Hall, and Nott, he was ordained as a foreign missionary at Salem, Mass., and a few days after, in company with Messrs. Hall and Nott, sailed from Philadelphia for Calcutta. During the voyage Mr. Rice adopted Baptist views, and on arriving at Calcutta found that Mr. Judson had reached the same conviction. He was baptized in Calcutta about 4 months after his arrival. As this change separated these two missionaries from the board which had sent them out, it was thought best that Mr. Rice should return to America to incite the Baptist churches to the missionary work, while Mr. Judson remained in India as a missionary. He accordingly sailed in March, 1813, and addressed himself to his duty with such zeal that numerous missionary societies were organized, and in the spring of 1814 the Baptist general convention was formed, and immediately adopted Messrs. Judson and Rice as its missionaries. It was deemed expedient however that Mr. Rice should remain for a time in the United States to aid in raising funds, and his labors in this cause were very successful. He also projected the establishment of the Columbian college at Washington, D. C., and for 10 or 12 years was its financial agent and manager, as well as general agent for the missionary board. He had great difficulties to encounter, and was not perhaps a skilful financier; and in 1826 the Baptist general convention severed its connection with the college, of which Mr. Rice continued to be the agent till his death. He was a powerful and effective rather than an eloquent preacher. During his laborious career he published numerous appeals and addresses.

RICE BIRD, or JAVA SPARROW. See FINCH.

RICE BUNTING. See BOBOLINK.

RICE PAPER, a variety of paper prepared in China and Japan from the stems of the *æchynomene paludosa*. (See PAPER, vol. xii. p. 732.)



**RICH, CLAUDIUS JAMES**, an English traveller and scholar, born near Dijon, Burgundy, March 28, 1787, died in Shiraz, Persia, Oct. 5, 1821. When 15 years old he was familiar with Arabic, Hebrew, Syriac, Persian, and Turkish. In 1803 he obtained a cadetship in the East India company's service, and in 1804 was made a writer at Bombay. He was appointed secretary to Mr. Lock, consul-general to Egypt, but went first to Constantinople and Smyrna to perfect his knowledge of Turkish. He then visited Egypt, and having perfectly acquired the Arabic language, he travelled over a great part of Palestine and Syria as a Mameluke, visited the grand mosque at Damascus with a company of pilgrims, and finally reached Basorah, whence he sailed to Bombay. Arriving there in Sept. 1807, he took up his residence in the house of Sir James Mackintosh, whose daughter he married the following year. In 1808 he was appointed by the East India company resident at Bagdad, where he remained about 6 years. He made collections of oriental manuscripts, medals, and coins, and of the gems and engraved stones found among the ruins of Babylon, Nineveh, and Ctesiphon. In 1811 he visited the site of Babylon, and published a work on its remains under the title of a "Memoir on the Ruins of Babylon." Major Rennell, in the "Archæologia," having doubted some of his conclusions, Mr. Rich undertook a second journey to that place, and in 1818 published a "Second Memoir on Babylon." In 1813 he left Bagdad on account of his health, went to Constantinople, and afterward to Paris, and in 1815 returned to Bagdad. In 1820 he travelled in Koordistan, going as far east as Sinna. After his death, which happened on a tour to Shiraz, the journal he kept during this journey was published by his widow under the title of "Narrative of a Residence in Koordistan" (1836). His collections were purchased by parliament for the British museum.

**RICHARD I. (CŒUR DE LION)**, second king of England of the line of Plantagenet, born in Oxford in Sept. 1157, died April 6, 1199. He was the 3d son of Henry II. and Eleanor of Aquitaine, and great-grandson in the female line of Henry I., youngest son of the conqueror. He received the chivalrous education that was common at that period, and became renowned for his proficiency in arms, and for his fondness for music and poetry. His fierce and turbulent character early manifested itself, as did also his ability as a soldier. He engaged with his brothers Henry and Geoffrey in a revolt against Henry II. before he had completed his 16th year, and fled to France, where he was knighted by Louis VII. Claiming Aquitaine and Poitou, he was compelled to give way before his father, to whom he surrendered, and by whom he was forgiven. He was then known as the count of Poitou, but claimed to be duke of Aquitaine. He was employed against the rebels in Aquitaine, whom he subdued, show-

ing much skill and energy in the war, and the duchy was ceded to him by his father, whose conduct with respect to it, however, shows that he did not consider the act of cession as one of binding force. The last rebellion in Aquitaine was aided by Richard's elder brother, Henry, whose death brought it to an end, and Richard became heir apparent, his eldest brother, William, having died young. The king then desired that Richard should give up Aquitaine to his brother John, which he refused to do, and by their father's orders John and Geoffrey ravaged their brother's territories, which Richard punished by invading Brittany, of which Geoffrey was ruler. The king then interfered to restore peace. Richard subsequently surrendered Aquitaine to his mother, but it was shortly after restored to him, and by his father's orders he entered upon a war with the count of Toulouse, which was successfully waged. In the war between Henry II. and Philip Augustus in 1187, Richard showed no want of fidelity to his father, but before it could be decided the interference of the pope put a stop to hostilities. Richard became intimate with Philip, which was offensive to Henry, and the prince was led to seize his father's treasure at Chinon, which he employed in fortifying castles in Poitou, at the instigation of the French king. Soon, however, a reconciliation was effected between the English monarch and his son, and the latter took the cross in the third crusade; but in spite of his vow he had to renew the war with the count of Toulouse, and with success. He also took part in the next contest between Henry and Philip; but a report prevailing that his father intended to exclude him from the succession, and confer the crown upon Prince John, Richard did homage to Philip for his English territories in France, under certain reservations. In the war that followed, Philip and Richard were victorious, and dictated terms to Henry, who soon after died of mortification, cursing his sons. Richard became king, July 6, 1189, and was greatly affected by his father's death. It is some excuse for his frequent rebellions, that his mother was ill treated by his father, and that Henry had seduced the princess Alice, sister of Philip Augustus, who had been promised to Richard in marriage. Henry was of a jealous and arbitrary temper, and by his conduct created the rebellions from which he suffered so much. Domestic dissensions, too, were the inheritance of the Angevine and Norman families that met in the person of Henry II. It was said of him: "He comes from the devil, and to the devil he will return." "The jealous Eleanor," says Michelet, "with the passion and vindictiveness of her southern blood, encouraged her sons' disobedience, and trained them to parricide. These youths, in whose veins mingled the blood of so many different races, Norman, Aquitanian, and Saxon, seemed to entertain, over and above the violence of the Fulk of Anjou and the Williams of England,

all the opposing hatred and discord of these races. They never knew whether they were from the south or the north; they only knew that they hated one another, and their father worse than all. They could not trace back their ancestry, without finding at each descent either rape, or incest, or fratricide." Richard's fondness for poetry and music became one of the means for increasing the discord that prevailed in the Plantagenet family; for it placed him under the influence of Bertrand de Born, who devoted his powers to breed strife between Henry II. and his sons, never allowing them to remain, according to Thierry, for an instant upon a good understanding, but constantly animating them one against the other by the *sercantes* or satirical songs so greatly in vogue at that time. At the beginning of his reign Richard exhibited a fair and moderate spirit in his intercourse with his subjects, with contemporary princes, and with his relatives. He freed his mother from the imprisonment to which she had been consigned by her late husband. The bigoted people having risen against and massacred the Jews at the time of his coronation, he condemned their conduct, and protected the proscribed race. His preparations for the fulfilment of his vow as a crusader in connection with Philip Augustus, while the emperor of Germany, Frederic Barbarossa, was starting with a vast army for the same purpose, were carried on vigorously, and they show that he was a careful and prudent leader, and not the mere knight errant on a throne that he is generally drawn. The government of England was placed in the hands of the bishops of Ely and Durham. On June 29, 1190, the French and English armies met on the plains of Vezelay, on the borders of Burgundy, 100,000 strong, beside attendants and camp followers. Separating, Philip led his forces to Genoa, while Richard proceeded to Marseilles. Embarking with a small part of his forces, he coasted Italy, and a portion of his fleet reached Messina in advance of him, where Philip soon afterward appeared. Richard arrived Sept. 28. The autumn and winter were passed by the crusaders in Sicily, which led to much trouble, Richard becoming involved in quarrels with the king of Sicily and his subjects, in which the French favored the latter. While at Messina, a treaty was made between Richard and Philip, which set the former free from his obligation toward the latter's sister Alice, and enabled him to arrange for his marriage with Berengaria, daughter of Sanchez, king of Navarre, who arrived in Sicily in company with his mother. Leaving Messina, April 10, 1191, his fleet encountered rough weather, and some of his ships were wrecked on the coast of Cyprus, and their crews were inhospitably treated by the ruler of that island, Isaac Comnenus, who endeavored to get possession of the persons of Berengaria and of Richard's sister Joan, dowager queen of Sicily. Richard conquered the island in a fortnight, and made Isaac a perpetual prisoner.

While at Cyprus he married Berengaria. On June 1 he sailed for Acre, capturing a Saracenic ship on his way. He found the French king at Acre, and that rivalry which defeated the object of the crusaders soon broke out, Philip favoring the faction of Conrad of Montferrat, while Richard supported Guy of Lusignan. Philip wished to assault Acre immediately, to which Richard objected, as all his troops had not arrived, and he was himself suffering from the pestilence that was raging in the Christian host. Philip made the attack, and was beaten. During his illness Richard is said to have received many courtesies from Saladin. He slowly recovered, and the siege was prosecuted, every attempt of Saladin to relieve the place failing. Acre was surrendered July 12, 1191, and on Aug. 1 Philip sailed for France. On the 20th Richard caused his Saracen prisoners to be butchered, because the terms of the surrender of Acre had not been fulfilled; and the next day he began his march toward Jerusalem, suffering much from the active operations of the light troops of Saladin. The battle of As-sur was fought Sept. 7, the crusaders completely defeating the Saracens. Joppa was taken by Richard, who was prevented from marching at once upon Ascalon by the opposition of his associates, who preferred making Joppa the basis of their operations. Richard however persevered, and with a portion of the crusading force proceeded to Ascalon, which he reached Jan. 20, 1192, and where he was joined by most of the French troops. The rebuilding of the walls was commenced and completed, and Richard hoped that in the spring he should be able to invest Jerusalem; but the dissensions of the Christians were renewed, and marred his plans. The news from England, too, required that he should return home. Still he adhered to the purpose of the crusade, and made arrangements to proceed to Jerusalem, but Saladin had so fortified that city that it was considered impregnable. Richard then expressed his readiness to lead an expedition into Egypt, but was not heeded. He returned to Acre, July 26, and was about to embark for England, when he heard that Joppa was in danger of falling into the hands of the Saracens. Hastening to its relief, at the head of a small force, he defeated Saladin, and afterward defended the place against an attack by the Mohammedans. A truce soon followed these Christian victories, and Richard left Acre Oct. 9, 1192. He was shipwrecked at the head of the Adriatic, and while seeking to continue his journey by land he became the prisoner of Leopold, duke of Austria, whom he had insulted and struck in Palestine. The German emperor, Henry VI., the son and successor of Frederic, who had perished in the expedition, approved of the duke's conduct in seizing and imprisoning the English king, intending to share the money he should be made to pay for his ransom. The king of France was desirous that Richard should not be released, and Prince

John sought his brother's crown; but the emperor, though willing to please Philip and John, was compelled to release Richard, according to terms agreed upon, and he reached England March 20, 1194. The greater part of the latter years of his reign was passed in France, where he carried on almost constant warfare with Philip Augustus, in which he won brilliant successes, that do not seem to have produced any permanent effect. In 1199 he laid siege to the castle of Chalus, to compel the viscount of Limoges to surrender a treasure that had been found in one of his fields, and which Richard claimed as sovereign lord of the soil. Here he received a wound, from which, as it was unskilfully treated, he died. He left no legitimate children, and his wife, Berengaria, who survived him many years, never visited England. Though popular as an English monarch, Richard was not an Englishman, and but a small portion of his life was passed in England.

RICHARD II., 8th king of England of the house of Plantagenet, born in Bordeaux, Jan. 7, 1367, supposed to have been murdered at Pontefract castle, Feb. 14, 1400. He was the second and only surviving child of Edward the Black Prince, eldest son of Edward III. His mother was Joan, sister of the last earl of Kent, who became countess of Kent in her own right, and who was a cousin of the Black Prince. Her second husband was Lord Holland, who died in 1360, and in 1361 she became Edward's wife. The prince dying June 8, 1376, Richard became heir apparent, and succeeded to the crown of England June 21, 1377, on the death of his grandfather. His coronation took place the same year, July 16. A council was appointed to conduct the business of government, the principal members being the king's uncles. The war between England and France was continued, to the disadvantage of the former country. Scotland was hostile to England; and the ambition of the duke of Lancaster and the earl of Cambridge, who by right of their wives expected to obtain possession of Spain, was the cause of trouble between England and the peninsula. The people were disgusted with the failures of their arms, and the odium that was attached to the government of Edward III. in the last days of that monarch was increased by the general bad rule of the regents. It was found necessary to lay new and heavy taxes, which were rigorously collected. The first poll tax, which bore upon persons in good circumstances, was submitted to; but when the tax was extended to persons of every condition, 8 groats being levied on each male and female above the age of 15 years, the returns were small. This was attributed to negligent collection, and a commission was appointed to enforce the tax. The proceedings of the commissioners were of the most inquisitorial character, and were peculiarly odious to the people from the insults to young women which they involved; and resistance was made in Essex, and soon afterward in Kent. At Dartford, in

Kent, one Walter the Tiler, having knocked on the head a tax gatherer who had insulted his daughter, was made chief of the insurgents, and hence the popular rising is known as Wat Tyler's rebellion. The people rose in 9 counties, and at first there was no enmity felt by them to the young king, the evils that afflicted the country being attributed to his counsellors; and they compelled all persons whom they met to swear fidelity to the king and the commons. Yet the insurrection partook of the character of the *Jacquerie* that had occurred in France 28 years before. An itinerant preacher, named John Ball, whom they had released from the prison to which he had been consigned by the archbishop of Canterbury for preaching doctrines like those of Wycliffe, was made their chaplain by the insurgents, and he proclaimed the most radical theories concerning the primitive equality of man. They marched upon London, and assembled to the number of 100,000 on Blackheath, June 12, 1381. The city was entered, the tower seized, and the archbishop of Canterbury, the treasurer, and several other persons of eminence, were put to death. There was some plundering, and the palace of the duke of Lancaster was destroyed. The early demands made upon the king were deemed reasonable, such as the abolition of slavery, the commutation of the dues of villenage, free trade in the market towns, &c.; and the king promised that they should all be complied with, whereupon many of the people returned to their homes. Tyler now became insolent, and made further demands upon the king, compliance with which was impossible; and in an interview with Richard, he behaved so arrogantly that he was slain by Sir William Walworth, lord mayor of London. The king, who was in his 15th year, immediately placed himself at the head of the rebels, thereby saving his own life and the lives of his attendants. They accepted him, and he led them into the country, and allowed them to depart without molestation. The promises made to the people were not kept, and they were punished with merciless severity, Tresilian, chief justice of the king's bench, anticipating the part which Jeffreys played 3 centuries later. Richard was married to Anne of Bohemia, eldest daughter of Charles IV., emperor of Germany, of the house of Luxemburg, and son of that blind king of Bohemia, John, who was slain at Crécy, fighting on the side of the house of Valois. An invasion of Scotland was made in 1385, the king heading a large army, which accomplished little. The duke of Gloucester, one of the king's uncles, made himself master of the kingdom, but Richard was induced by his favorite, the earl of Oxford, to attempt to throw off the yoke. The consequence was a contest between the king and his favorite, supported by their adherents, and the members of the royal house, supported by most of the nobles, and by the people. Gloucester triumphed, and was placed at the head of a council of regency in

1886, which held sovereign power. In 1887 the king, who was aided by the judges, sought to recover his power, but Gloucester defeated his soldiers, and slaughtered or banished his immediate supporters, Oxford, who had been made duke of Ireland, being one of those who went into exile. Two years later the king was more successful, and changed his ministers, Gloucester himself being removed. The duke of Lancaster supported the king, who was now 23 years old, and there could be no pretence for keeping up the regency. The French war languished, and that with Scotland was remarkable only for the battle of Otterbourne, in which the Scotch were victorious. A truce for 25 years was concluded with France, and, Queen Anne having died in 1394, it was provided that Richard should marry Isabella, daughter of Charles VI., in 1396, though the princess was but 9 years old. Gloucester endeavored to recover his former power, but failed, the king being supported by parliament, and crushing his enemies. The archbishop of Canterbury and the earl of Warwick were banished, the earl of Arundel was beheaded, and the duke of Gloucester was imprisoned at Calais, where he died under circumstances that created the suspicion that he had been murdered by the king's orders. Richard banished Henry of Bolingbroke, son of the duke of Lancaster, in 1398, for 10 years; and on the death of Lancaster he made the term of banishment perpetual, and seized the estates of the exile. As Richard had now become very unpopular, Henry determined to return to England, under pretence of recovering his paternal estates, taking advantage of the king's absence, he having gone to Ireland. In July, 1399, he landed at Ravenspur, accompanied by a few eminent Englishmen, who also had been banished by Richard. He was joined by several powerful nobles, whose example was promptly followed by people of all degrees, and London supported the cause of Lancaster. Richard returned from Ireland, but was seized and imprisoned, and deposed by parliament, a renunciation of the crown having previously been obtained from him. Lancaster was called to the throne, and became king as Henry IV. Parliament thus set aside the legitimate heir to the throne, Roger Mortimer, earl of March (grandson of Lionel, duke of Clarence, 8d son of Edward III.), upon whom an earlier parliament had settled the crown, in accordance with the received laws of inheritance. The bishop of Carlisle opposed the deposition of Richard II., and the transfer of the crown to the duke of Lancaster, on the ground of divine right. Richard was imprisoned in Pontefract castle, and it is supposed that he was there murdered by his keeper, Sir Piers Exton. A corpse, purporting to be that of the ex-king, was exhibited in London for two days, and was buried in Westminster abbey; but the tomb having been accidentally opened, long afterward, no marks of violence were found on the skull. One story was, that

he was starved to death. It has been plausibly maintained by an eminent Scotch historian, Mr. Fraser Tytler, that Richard escaped from Pontefract, and fled to the Western islands, was there recognized, and carried to the Scotch court, where he died in 1419, and was buried at Stirling. Richard was a weak prince, and owed his fall to his fondness for favorites, to the vehemence of his despotism in the latter part of his reign, and to the wantonness of his expenditures, which England was then ill able to bear. That he was partial to peace did not help him to the affections of his subjects, and the French alliance assisted to swell the current of unpopularity by which he was at last swept away. He was fond of literature, like most of the Plantagenets, and appreciated and enjoyed the works of Chaucer, Gower, and Froissart. In the 16th year of his reign (1398) the statute of *præmunire* was enacted.

RICHARD III., last king of England of the Plantagenet line, born at Fotheringay castle, Oct. 2, 1452, killed at the battle of Bosworth field, Aug. 22, 1485. He was the 11th child and 8th son of Richard, duke of York, and of his wife, Cecily Neville, daughter of the earl of Westmoreland. The duke of York was descended in the female line from Lionel, duke of Clarence, 8d son of Edward III., and the English throne was held by Henry VI., great-grandson of John, duke of Lancaster, Edward III.'s 4th son. York became the chief of that party which sought to set aside the line of Lancaster, but was defeated and captured at Wakefield at the close of 1460, and immediately executed. His son Richard was a victim of the wars of those times even in his childhood, and was a prisoner at the age of 7 years. On his father's death, Richard was sent by his mother to Utrecht. When his eldest brother became king of England, in 1461, as Edward IV., Richard was brought home, and made duke of Gloucester, Nov. 4, and large possessions were conferred upon him. Of his life for some years after this date nothing is positively known, but it is supposed that he was made the ward of the earl of Warwick, "the king maker," and that he resided mostly at Middleham castle. In his 14th year he was made a knight of the garter. His first public act was to aid in escorting his sister Margaret to Margate, when she was married to the heir of the duke of Burgundy, in 1468. The king was strongly attached to Richard, who repaid his affection with a fanatical fidelity, which Warwick could not shake. Beside greatly increasing Richard's wealth by grants of the forfeited estates of Lancastrian nobles, the king created him lord high admiral and chief constable of England for life, and nominated him chief justice of South Wales in 1468. When the earl of Warwick and the duke of Clarence (the king's brother George) rebelled, the duke of Gloucester was appointed commissioner of array in the county of Gloucester, March 26, 1470; and on April 15 he was named to the same office

in Devonshire and Cornwall. The same year he was made warden of the northern marches; and in September he accompanied the king when he fled to Flanders because of the triumph of Warwick at the head of the Lancastrian party. The parliament that then assembled attainted and outlawed Gloucester. When Edward returned to England, Gloucester was in his train, and had the principal part in effecting that reconciliation between the king and Clarence which restored the throne to the house of York. At the battle of Barnet, April 14, 1471, Gloucester commanded the van of the Yorkist army, being in immediate opposition to Warwick, and by his conduct proved himself to be a skilful leader and a brave soldier, and contributed to the victory of his brother. The same post was assigned to him at the battle of Tewkesbury, 20 days later, and his action fully justified the selection. The story, long received, that he took part in the butchery of Prince Edward of Lancaster, son of Henry VI., after the battle, is not only unsupported by direct evidence, but is contradicted by evidence of a circumstantial character. Nor is there any proof that he was concerned in the death of Henry VI., who is supposed to have been slain in the tower of London, May 21. In reward for his services, the king created Gloucester lord high chamberlain of England for life, the office having been last previously held by Warwick; and he endowed him with a large number of manors and lordships that had belonged to the Nevilles, and several forfeited estates. He was restored to the office of lord high admiral, which Warwick had held during the brief restoration of Henry VI., and made earl of Dorset and earl of Somerset. He sought and found the lady Anne Neville, Warwick's youngest daughter, and married her. This lady had been betrothed to Prince Edward of Lancaster, but the marriage ceremony had not taken place. After the overthrow of the Lancastrians and the death of Warwick, Anne was placed in the custody of her sister Isabel, duchess of Clarence; and the duke of Clarence, who was opposed to Gloucester's suit, caused his sister-in-law to be concealed, and she was for some time a kitchen girl in London. She was found by Gloucester, and they were married about the month of March, 1472. On Feb. 29, 1472, Gloucester was a second time appointed lord high constable of England. Shortly afterward he was nominated to the office of "keeper of all the king's forests beyond Trent, for life," and justiciary of North Wales. On May 20 he resigned the office of great chamberlain, and took up his official residence at Pontefract castle, as chief seneschal of the duchy of Lancaster. He became virtual ruler of the north of England, where the Lancastrians were very numerous, and so wisely did he govern there that his memory was long cherished by the people as that of a just prince. Middleham castle, which had been given him from the spoil of Warwick, was his favorite residence, and there his son

Edward was born in 1473. Gloucester exerted his influence with the king to mitigate the horrors of the contests of those times, and especially in behalf of the Nevilles. When Edward IV. invaded France in 1475, Gloucester accompanied him, and was the only Englishman of note in the army who was neither corrupted nor cajoled by Louis XI. He returned to England, and resumed his residence in the north. With the bitter quarrels of the king and his brother of Clarence Gloucester had no connection, and it is stated by one of his enemies that he openly but hypocritically opposed the execution of Clarence. The only portion of Clarence's country possessions that he received was Barnard castle in Durham, which became one of his favorite places of abode. He received the office of chamberlain, made vacant by Clarence's death, was constituted admiral of England, Ireland, and Aquitaine, and appointed "one of the triers of petitions" in the parliament that met in 1478. War breaking out between England and Scotland, Gloucester was created lieutenant-general of the kingdom, and in June, 1482, he took possession of Berwick, and penetrated to Edinburgh, at the head of a large army, and compelled the Scotch to accede to the terms of peace he proposed. He treated the vanquished with great moderation, and would not allow the pillage of Edinburgh. He was thanked by the king and parliament for his deeds. One of the king's last acts was to bestow upon his brother the wardenship of the west marches of England, the lordship of Carlisle with every thing connected therewith, and a large sum of money. Edward IV. died in April, 1483, and Richard, who was then in the north, prepared to go to London, and took the oath of allegiance to his nephew, Edward V., and compelled all who were under him also to take it. Hastening south, he seized the young king's person, and escorted him to the capital, having imprisoned Lords Rivers and Grey, and some other persons of the queen mother's party. Gloucester was appointed "protector and defender of the realm" by the council of state, which act parliament confirmed. But his ambition now took a very decided form; and because he felt that he had to choose between wearing the crown and being finally made a victim of the queen mother's party, he resolved to make himself king. His proceedings are involved in much obscurity, but on June 13 Lord Hastings, the lord chamberlain, was suddenly seized at the tower by Gloucester's order and put to death, without even the form of a trial, on the charge of having been concerned in a conspiracy against the protector and for the seizure of the government. Hastings, to whom Gloucester was attached, was probably murdered because Gloucester knew that he never would be false to Edward V. The children of Edward IV. were declared illegitimate, because their father had entered into a pre-contract with Lady Elinor Butler before he married Elizabeth Grey. The young

king was set aside by the estates of the realm, by whom Gloucester was requested to ascend the vacant throne. He complied, and became king June 26, 1483, with the style and title of Richard III. No opposition was made to him. His coronation took place July 6. His proceedings as a monarch were of a popular character, but the people soon began to murmur because of the fate of the young princes, the late king Edward V. and his brother Richard, duke of York. They had been placed in the tower, and it was believed that they were there murdered by Richard's orders; but the disposition that was made of them is a mystery to this day, and very plausible arguments have been made in support of Richard's innocence of their murder. The duke of Buckingham, who had been the chief agent in Richard's elevation to the throne, soon became dissatisfied with his master, and entered into a conspiracy for his overthrow. The earl of Richmond, who was regarded as the head of the Lancastrian party, was to be made king, on condition that he espoused Elizabeth, eldest daughter of Edward IV. This conspiracy failed, and Buckingham was executed. The queen dowager was prevailed upon to leave sanctuary, in which she had taken refuge, and to place herself and family in the king's hands. The parliament of 1494 confirmed the king's title, and settled the crown on his son Edward, prince of Wales; but that prince died April 9. Edward, earl of Warwick, son of the late duke of Clarence, was then named heir to the crown, but was soon set aside, and there was substituted for him the earl of Lincoln, eldest son of the king's eldest living sister, the duchess of Suffolk. In March, 1485, the queen died of a decline. Richard has been charged with having poisoned her, but the story is a pure invention. Nor did he ever think of marrying his niece Elizabeth, another offence that was attributed to him. But he had now become very unpopular, because of the forced loans he had made, though his general legislation was good, and is highly praised by Bacon; and he liberally encouraged religion and letters. The earl of Richmond, after a number of failures, resolved to make another attempt to gain the English crown. Assisted by the French government, and by the duke of Brittany, he sailed on July 20 and landed at Milford Haven, Aug. 1, 1485. Richard had assembled a large army, and would have easily crushed his rival but for the infidelity of some of his nobles. The two armies met on Bosworth field, Aug. 22, and Lord Stanley went over to Richmond in the heat of the battle, while the earl of Northumberland, who commanded the second line of the royal army, stood aloof. Even then the king might have retrieved his fortune but for the conduct of Sir William Stanley, who had remained neuter until Richard had hewn his way to where Richmond stood, when he joined the Lancastrians at the head of 3,000 men. This decided the result of the battle. Richard fell fighting bravely, de-

claring that he would die king of England. His body was basely treated by the victors, and was begged and buried by the nuns of Leicester in their chapel. The reason why Richard's character in English history is so bad is to be found in the fact that he offended both the Lancastrian party and the York party, and that the troubles of the wars of the roses, growing out of a disputed succession to the throne, had so disturbed men's minds that they were never forgotten until the accession of the Stuarts in 1603, when they gave way to a new class of fears; and Richard's conduct in disturbing the order of succession, though not without excuse on personal grounds, is open to severe censure as a political proceeding. Shakespeare's historical plays, too, have given permanent places to utterly false views of the great struggle of the 15th century, his "Lancastrian partialities, and a certain knack at embodying them," as Sir Walter Scott says, having "turned history upside down, or rather inside out." The Richard III. and Lady Anne of Shakespeare are as purely ideal characters as Prospero and Miranda. With the death of Richard III. ended the line of Plantagenet, which had ruled in England 331 years (1154-1485), and under 14 sovereigns.

RICHARD DE BURY, an English prelate and statesman, born in 1287, probably in Bury St. Edmund's, died at Auckland, April 14, 1345. He studied at Oxford, and was appointed tutor to Prince Edward, afterward Edward III., and receiver of his revenues in Wales. When Edward with his mother fled to Paris and was there distressed for want of money, De Bury, taking with him a large sum in gold, the receipts of his office, secretly hastened to the prince's relief, and was pursued to Paris by the king's lieutenant and a band of horsemen, and only escaped capture by concealment. When Edward came to the throne Richard was made cofferer to the king, and afterward treasurer of the wardrobe and clerk of the privy seal. During the first 6 years of Edward's reign, he also held a great number of church preferments, and visited Rome twice as legato to Pope John XXII. In 1338 he became bishop of Durham, and in 1334 chancellor and high treasurer of England, and within the 3 following years was thrice ambassador to the king of France. He appears to have relinquished his many political appointments about 1338, and thenceforth resided in his diocese. He became noted as a book collector, and kept an establishment of stationers, illuminators, and bookbinders in his palace. It is said that he eventually owned more books than all the other bishops in England together. Upon his death they were bequeathed to a hall at Oxford on the site where was subsequently founded Durham (now Trinity) college. He is said to have written *Orationes ad Principes*, but no copy of it is known. His only work extant is a small treatise entitled *Philobiblon* (translated by Inglis, London, 1832, Albany, 1861).



**RICHARD OF CIRENCESTER**, an English monk and historian of the 14th century, named from his native town of Cirencester in Gloucestershire, died about 1401. He entered the Benedictine monastery of St. Peter, Westminster, in 1350. Most of the libraries in England were visited by him, and in 1391 he obtained leave to visit Rome. He wrote *Historia ab Hengista ad Annum* 1348, and some theological treatises; but the work by which he is best known is the treatise *De Situ Britanniae*, discovered in manuscript at Copenhagen in 1747, and reprinted in Bohn's "Six Old English Chronicles." Its authenticity is questioned.

**RICHARDS, WILLIAM**, an American missionary, born in Plainfield, Mass., Aug. 22, 1792, died in Honolulu, Dec. 7, 1847. He was graduated at Williams college in 1819, and at Andover theological seminary in 1822, and on Nov. 19, 1822, embarked from New Haven as a missionary to the Sandwich islands. In 1838 he became councillor as well as interpreter and chaplain to the king, and after the recognition of the independence of the islands by foreign powers was sent as ambassador to England and other courts. Returning in 1845, he was appointed minister of public instruction. He had great influence over the king and government.

**RICHARDSON, CHARLES**, an English philologist, born in July, 1775. He was intended for the law, but early abandoned it for philology. In 1805 appeared his first work, entitled "Illustrations of English Philology," in which he strenuously advocated the principles of language set forth by Horne Tooke, and advanced some criticisms on Johnson's dictionary and some observations on Dugald Stewart's essay "On the Tendency of some late Philological Speculations." Not long afterward he undertook the lexicographical portion of the "Encycædia Metropolitana," of which the first part appeared in Jan. 1818; but after the issue of the 4th part the work was suspended for some years. In Jan. 1835, the publication of the dictionary as a separate work was commenced, and finished at the end of 1837 (2 vols. 4to.). He has also published a volume "On the Study of Languages," which professes to be an exposition of the principles laid down in the "Divisions of Purley." He has furnished several papers to the "Gentleman's Magazine," among which are "An Historical Essay on English Grammar and English Grammarians," and one on "Fancy and Imagination."

**RICHARDSON, SIR JOHN**, a Scottish naturalist and arctic explorer, born in Dumfries in 1787. He was educated at a school in his native town, studied medicine at the university of Edinburgh, and in 1816 received his medical degree. He had entered the navy in 1801 as an assistant surgeon, and subsequently became acting surgeon in the Hercules, 74, and in 1819 accompanied Sir John Franklin in his arctic expedition as surgeon and naturalist. He also accompanied the same commander in a second expedition in 1825, and with one de-

tachment of the party explored the coast E. of the Mackenzie to the mouth of the Coppermine river. In 1838 he was appointed physician of the fleet, in 1840 an inspector of hospitals, and in 1846 was created a knight. In 1848 he commanded one of the 3 expeditions which went out in search of Sir John Franklin, and returned in Nov. 1849. In 1855 he retired from the naval service. He has written a number of works embodying much information in regard to the geology, geography, and natural history of arctic North America. Of these one of the most important is the *Fauna Boreali Americana* (4 vols. 4to., London, 1829-'37), in which he was assisted by Swainson and Kirby. He has also contributed to the natural history of the voyages of Capt. F. W. Beechey, of Sir James Ross, of Sir Edward Belcher, and of Capt. Kellett, beside publishing an account of "The Arctic Searching Expedition, a Journal of a Boat Voyage through Rupert's Land and the Arctic Sea," &c. (2 vols. 8vo., 1851), and "The Polar Regions" (8vo., Edinburgh, 1860).

**RICHARDSON, RICHARD**, an American revolutionary soldier, born near Jamestown, Va., in 1704, died in Sumter district, S. C., in Sept. 1780. He emigrated about 1725 to South Carolina, and settling in Sumter district, then called the "neutral ground," became a successful farmer, was made a colonel of militia, and in 1775 was elected from his district to attend the council of safety in Charleston. In the same year he was instrumental in quelling a dangerous revolt among the loyalist population of what was known as the "back country," for which he received the thanks of the provincial congress, and was promoted to be a brigadier-general. In 1776 he was elected a member of the legislative council, and he subsequently participated in the defence of Charleston, at the capture of which he became a prisoner of war. Lord Cornwallis made fruitless endeavors to win him over to the royalist cause. His health failing from confinement, he was sent home, but died soon after. Col. Tarleton subsequently burned his mansion house, and caused his body to be dug up to verify the fact of his decease.—**JOHN PETER**, grandson of the preceding, born at Hickory Hill, Sumter district, S. C., April 14, 1801. He was graduated at the South Carolina college in 1819, and between 1824 and 1836 was a member of the state legislature. During the nullification excitement he was one of the leaders of the union party, and in the convention which passed the ordinance of nullification steadily opposed that measure. In 1836 he was returned to congress, and in 1840-'41 was elected governor of South Carolina, in which capacity he organized the present military academies of the state. In 1850 he was one of the delegates at large from South Carolina to the southern convention, and in the succeeding year he presided over the meeting of the southern rights association in Charleston. As a member of the state convention which assembled in Columbia in 1852 with the avowed

purpose of secession, he opposed the separate secession of the state.

RICHARDSON, SAMUEL, an English author, born in Derbyshire in 1689, died July 4, 1761. He was the son of a joiner, and at the age of 16 was apprenticed to Mr. John Wilde, a printer of London, with whom, after the expiration of his apprenticeship, he remained several years in the capacity of foreman. He then set up a printing office for himself, and through the interest of Mr. Speaker Onslow obtained the employment of printing the journals of the house of commons; and in 1760 he purchased the moiety of the patent of law printer to the king. In the year 1754 he was master of the stationers' company. During his apprenticeship and for a number of years afterward he was in the habit of devoting several hours of each day to reading and study. To his avocation of printer he gradually united that of preparing indexes, prefaces, or dedications to the works which he printed; and so impressed were his friends, the publishers Rivington and Osborne, with the fluency of his epistolary style, that they urged him to write a book of familiar letters on the useful concerns of life. The result was his first novel, "Pamela," commenced after he had passed the age of 50, and published in 2 vols. in 1741. Its success was decided; 5 editions were published within a year, eminent literary men spoke warmly in favor of its moral tone, and it was even recommended from the pulpit. Richardson subsequently wrote 2 additional volumes, which are considered greatly inferior to the first. He also collected and published the series of "Familiar Letters" out of which the project of "Pamela" had arisen. In 1748-9 appeared his 2d and best novel, "The History of Clarissa Harlowe," in 8 vols., which, beside passing through several editions at home, was speedily translated into French and German, and made the author's name familiar throughout Europe. His last work of fiction was "The History of Sir Charles Grandison," written like its predecessors in the epistolary form, and published in 1753 in 7 vols. Richardson also published an edition of "Æsop's Fables with Reflections," "Familiar Letters to and from several Persons upon Business and other Subjects," and some contributions to periodicals. His "Correspondence," with a biographical account of the author and observations on his writings, was published by Mrs. Barbauld in 1804 (6 vols. 12mo.).

RICHELIEU, a W. co. of Canada East, bounded N. W. by the river St. Lawrence, and S. E. by the Yamaska, and intersected by the river variously called Richelieu, Sorel, St. John, and Chambly; area, 373 sq. m.; pop. in 1851, 25,686. Capital, Sorel.

RICHELIEU, ARMAND JEAN DUPLESSIS, cardinal and duke of, a French statesman, son of François Duplessis, lord of Richelieu, born in Paris, Sept. 5, 1585, died there, Dec. 4, 1642. He was first destined to the career of arms, and began his military education as marquis du

Chinon; but his elder brother having resigned the bishopric of Luçon, which had been for a long time in the family, he decided to take holy orders in order to succeed to that office. He then studied theology, and was promoted to the rank of bishop when only 22 years old. In 1614, having been elected one of the deputies of the clergy to the states-general, he took advantage of the opportunity to ingratiate himself with Maria de' Medici, assisted by the kind offices of Barbin, then comptroller of the treasury, and by the protection of Marshal d'Ancre. He was appointed almoner of the queen mother, who caused him to enter the council of state, notwithstanding the decided antipathy of Louis XIII. When, after the murder of Marshal d'Ancre, Maria de' Medici fell into disgrace and was exiled to Blois, Richelieu accompanied her, actuated less by any impulse of gratitude than by a far-sighted calculation of self-interest. His efforts to bring about a reconciliation between the king and his mother proved so unsuccessful, that their only result was his own banishment to his diocese of Luçon, which was soon followed by a removal to Avignon, where he devoted himself to writing on religious subjects, and produced among other works one entitled *De la perfection du Chrétien*, a book of austere morals and exalted asceticism. But when Maria de' Medici was recalled to the court, not unmindful of the devotion of Richelieu, she reinstated him in favor. From that period his credit constantly increased. Having confirmed his position by the marriage of his niece with the nephew of the duke de Luynes, constable of France, he received the cardinal's hat (1622), reentered the state council, and soon after, in spite of the unabated dislike of Louis XIII., rose to the premiership. No sooner had the cardinal thus taken possession of power under a king unable to govern by himself, than he entered upon the policy which has secured for him a place among the greatest statesmen in modern history. This policy may be summed up in three principal designs combined for the consolidation of the monarchy and the greatness of France: 1, the consummation of the work of Louis XI. by the extinction of the last remains of feudalism, and the full subjection of the high nobility to the royal power; 2, the subjugation of Protestantism in France, where it had assumed a character as much political as religious, threatening to create a state within the state; 3, the abasement of the house of Austria, by crushing its ambition for universal domination, and consequently the elevation of the power of France abroad on the ruins of her formidable rival. As a preliminary step, in 1626 he took from Austria the passes of the Valtellina, to secure them to Switzerland; and in the same year he set on foot the war against the Protestants and England, which extended to them her protection. How far that war may have been determined by the private feelings of the duke of Buckingham and secret resentments of Richelieu, arising from an alleged

rivalry in the good graces of the queen, Anne of Austria, does not matter much in events of such magnitude. The truth is that the two leaders of the French Protestants, Henri de Rohan and his brother the duke de Soubise, went to London in order to negotiate a close alliance with the duke of Buckingham, who in 1627 directed to their support a fleet of 100 sail, with a land force of 7,000 men. The capture of the island of Ré was the object of their expedition. But the governor Toiras, with limited resources, opposed so brilliant a defence that it became necessary to raise the siege, and the whole of the British armament returned ingloriously to England. Encouraged by this first success, Richelieu determined to strike at once a decisive blow, by taking from the Protestants their most important stronghold. The siege of Rochelle was begun in earnest, and prosecuted with an activity to which the presence of the cardinal himself added a new impulse. The besieged made so desperate a resistance that the population of the city was reduced by war and famine from 30,000 to 5,000 souls, when they surrendered on Nov. 1, 1628. This event, followed by the treaty of Alais and the edict of Nîmes, put an end to the political power of Protestantism in France, and one of Richelieu's designs was accomplished. The other, against the high nobility, had been already accomplished by the imprisonment in the castle of Vincennes of the marshal d'Ornano, confidant and favorite of Gaston of Orleans, brother of the king. On hearing of that bold measure, the lords hastened to Fontainebleau, and there laid the first plot against the life of the formidable cardinal, who, being informed of it, decided at once to make such an example as would strike terror into the hearts of his enemies. The victim was the count de Chalais of the house of Perigord, a giddy young man, led away far more by his love for the duchess de Chevreuse than by any political hatred. Arrested and thrown into a dungeon of the castle of Amboise, it is said that he was there seduced into disclosures against the queen by false promises of mercy. But this weakness did not save his life. He was beheaded, or rather clumsily butchered by the executioner (1626), his accomplices being either detained in prison or dispersed. But to repress conspiracies was not enough for Richelieu, who meant to bring the nobility to practical obedience and submission to the royal power. In order to stop a bloody mania which threatened to deprive the country of the flower of its young noblemen, the penalty of death had been proclaimed against those who should fight duels. In defiance of the ordinance, in 1627 two young nobles of the highest rank fought in Paris, in the Place Royale itself. François de Montmorency, seigneur de Bouteville, and the count des Chapelles both paid with their lives the penalty of this offence against the royal authority. The consolidation of the government at home did not divert the cardinal from carrying out his plans abroad. Charles de Gonzague, duke

of Nevers, legitimate heir to the duchy of Mantua, without any help but the protection of France, was maintained in possession of his inheritance by force of arms. This war set at variance for the first time the cardinal and his early protectress Maria de' Medici, who in this instance joined Anne of Austria in a common opposition to the prime minister. The misunderstanding soon degenerated into a deep hatred, and the queen mother determined to destroy the favorite whom she had elevated. So nearly did she succeed in her purpose that the cardinal was informed of his dismissal. The courtiers flocked at once around the new power, zealous to be the first to insult the fallen minister in the saloons of the Luxembourg palace, where both queens exulted in their triumph. But in the mean time Richelieu went to Versailles, where the king had gone to hunt. An immediate reconciliation took place between the minister and the monarch, of which the report, spread about in Paris, soon terrified the over hasty flatterers, and made them vacate the Luxembourg even quicker than they had filled it. This event is known in the history of France under the name of *la journée des dupes*. Richelieu, more powerful than ever, took revenge at once upon those who had so imprudently pronounced against him. Marillac, who had been selected as his successor, was arrested and exiled to Lisieux, while his brother the marshal de Marillac, being of more consequence, was imprisoned and afterward put to death. Maria de' Medici, however, did not yet consider herself defeated, and, with the assistance of Gaston of Orleans, brother of the king, laid new plots against the cardinal. This proved her ruin; she was exiled from France in 1631, while her partisans either shared her fate or were cast into prison. The widow of Henry IV. took refuge at Brussels, whence she went to England, and for years wandered through Europe without home, money, credit, or comfort, pursued everywhere by the implacable resentment of Richelieu. At last she died in Cologne, July 3, 1642, in utter penury, not however without having attempted to reconquer her lost position. In 1631, the year when Richelieu was elevated to the dukedom and peerage, the duke of Orleans, her former associate, went to join her in Brussels, where he raised an army of 2,000 men, having first secured the coöperation of the marshal duke of Montmorency, governor of Languedoc. The two chiefs of this new rebellion met at Lunel, and fought the royal army at Castelnaudary. Fortune decided against them. Montmorency, wounded and captured after prodigies of valor, was taken to Toulouse, and there tried, sentenced, and executed. The duke of Orleans contrived as usual to be pardoned, and made his submission once more. The 30 years' war was then raging in Germany, where Ferdinand II., emperor of Austria, endeavored to stay the progress of the reformation, and to maintain Catholic unity in his dominions. But Richelieu

did not hesitate to take sides with the Protestants. To him the interests of the church were second to those of the state. He was a minister and statesman more than a cardinal, and assisted Gustavus Adolphus by subsidies in his war against the house of Austria. The power of Richelieu had now attained its highest prosperity both at home and abroad. On one side the nobility had sealed their submission on the day when the duke of Epemon, governor of Guienne, and one of the highest lords of France, having had a quarrel with the archbishop of Bordeaux, one of the *protégés* of Richelieu, submitted to the humiliation of asking pardon of the haughty prelate, and of receiving absolution from him on his knees. On the other hand, his foreign policy was everywhere successful. While the power of Austria was assailed through the sword of the king of Sweden, the revolution was at the same time encouraged in England, whose court had been a refuge for Maria de' Medici. When Gustavus Adolphus fell at Lützen, dying in the midst of victory (1632), Richelieu contrived to secure to France new possessions on the left bank of the Rhine, and the services of the duke of Saxe-Weimar with his army. Unrelenting in his vast designs as long as any thing remained undone, he now declared war against Spain, and was himself present at the capture of Perpignan. Austria was now humiliated, Portugal was separated from Spain, French influence predominated in Catalonia, England was in full revolution, and France quiet and prosperous. Still, the administration of this great minister was again threatened by intrigues at court or treason in the camps. An attempt, based upon a passion of Louis XIII. for Mlle. de Lafayette, had no result but the retirement of the intended mistress to the convent of Chaillet, and the dismissal of the ordinary confessor of the king. Nor was the rebellion of the count de Soissons, prince of the blood, any more successful, its leader being killed in his first battle against the royal troops at Sedan (1641). The last of these conspiracies of a turbulent nobility was the secret treaty of alliance concluded with Spain by the duke of Bouillon and the incorrigible duke of Orleans. The young marquis de Cinq-Mars, although indebted to Richelieu for the high favor and the high offices that he enjoyed at court, was one of the first among the conspirators. He was sentenced and executed at Lyons, with his friend De Thou, Sept. 12, 1642. After this last vindication of his power, Richelieu, an invalid, returned to Paris in triumph, carried on a litter by his guards, escorted by an army, and surrounded by the utmost pomp, more like a sovereign than a subject. Two months after, his unrivalled fortune being at its very zenith, he died, at the age of 57 years, in that truly royal palace which to the present day bears testimony to his grandeur. Beside the political successes of Richelieu, the period of his rule was one of great literary distinction. Corneille, Descartes, and Pascal

were his contemporaries; and he himself was the founder of the French academy. He also founded the *jardin du roi*, now the *jardin des plantes*, and enlarged the Sorbonne. He wrote two plays, *Mirame*, a comedy, and *La grande pastorale*, neither of any value. He is regarded as the author of the *Mémoires du cardinal de Richelieu*, first published complete by Petitot in his collection of memoirs relating to French history (Paris, 1823); the *Testament politique du cardinal de Richelieu* (2 vols., 1774); and of the *Journal du cardinal de Richelieu, qu'il a fait durant le grand orage de la cour* (2 vols., Amsterdam, 1664).—The cardinal's elder brother, who had resigned the bishopric of Luçon to retire to a Carthusian convent, was reluctantly compelled afterward to resume high offices in the church. Archbishop of Aix in 1626, archbishop of Lyons in 1629, grand almoner of France in 1632, he died in 1653, 71 years of age. Richelieu had two sisters, of whom Françoise, the elder, married René de Vignerod, and had a son who died in 1646, leaving two sons, the elder of whom, LOUIS FRANÇOIS ARMAND DUPLESSIS, known as the marshal de Richelieu, born March 13, 1696, died Aug. 8, 1788, succeeded to the dukedom of his great-uncle, commanded in the 7 years' war, and was one of the most notorious *roués* and worthless characters in French history. His grandson, ARMAND ÉMANUEL DUPLESSIS, duke de Richelieu, born in Paris, Sept. 25, 1766, died there, May 16, 1822, was active as an agent of the French royal family during the revolution, entered the Russian civil service, was governor of Odessa under Alexander I., refused to serve Napoleon, was prime minister under Louis XVIII., succeeded in procuring from the allies terms much less severe than they had required from the French government, though poor refused a national recompense from the chambers, and, when a pension of 50,000 francs was conferred on him, gave it to found a hospital at Bordeaux. He was out of office during the administration of Decazes, but resumed power in 1820 for about a year. He was a man of admirable qualities of character, though not of extraordinary ability.

RICHER, ÉDOUARD, a French author, born in Noirmoutiers, department of Vendée, June 12, 1792, died in Nantes, Jan. 21, 1834. His father was a soldier, and fell in battle with the Austrians in 1793. The national convention by a special decree adopted the young orphan, who, however, from delicate health did not follow his father's profession, but devoted himself to literature. He published in 1816 a poem entitled *Victor et Amélie*, in 1821 a history of Brittany, and a great number of essays and reviews in the *Lycee Armoricain*, of which he was for several years the editor. He became a convert to the doctrines taught by Swedenborg, and wrote a series of works in elucidation of them, the first and second of which, *La religion du bon sens* and *La clef du mystère*, have been translated into English. A collection of his

Swedenborgian writings appeared at Nantes in 8 vols. (1892-'6), and his literary remains were edited in 1836, with a biography, by Emile Souvestre.

**RICHLAND.** I. A central district of S. C., bordered W. and S. W. by the Congaree, and E. by the Wateree, and drained by their branches; area, 465 sq. m.; pop. in 1860, 18,334, of whom 11,031 were slaves. It has a somewhat hilly surface, with pine forests, and a fertile soil. The productions in 1850 were 433,998 bushels of Indian corn, 34,267 of oats, 94,864 of sweet potatoes, 87,970 lbs. of rice, and 11,365 bales of cotton. There were 18 grist mills, 14 saw mills, 3 cotton gin factories, 1 iron foundry, 8 newspapers, 22 churches, 3 colleges, and 212 pupils attending public schools. The Columbia branch of the South Carolina railroad, the Greenville and Columbia, and the Charlotteville and South Carolina railroads all concentrate at the capital, Columbia. II. A N. co. of Ohio, drained by the head waters of the Walhonding river; area, about 450 sq. m.; pop. in 1860, 31,156. It has an undulating surface and fertile soil. The productions in 1850 were 347,487 bushels of wheat, 495,253 of Indian corn, 301,858 of oats, 2,779 tons of hay, 194,573 lbs. of wool, and 587,705 of butter. There were 21 grist mills, 21 saw mills, 8 woollen factories, 10 tanneries, 71 churches, and 15,397 pupils attending public schools. The Cleveland, Columbus, and Cincinnati, the Pittsburg, Fort Wayne, and Chicago, and the Sandusky, Mansfield, and Newark railroads traverse the county, the two latter passing through the capital, Mansfield. III. A S. E. co. of Ill., drained by tributaries of the Wabash river; area, about 310 sq. m.; pop. in 1860, 9,711. It has a nearly level surface and a fertile soil. The productions in 1850, since which the population has more than doubled, were 113,205 bushels of Indian corn, 5,836 of wheat, 25,848 of oats, and 4,658 lbs. of wool. There were 4 churches, and 860 pupils attending public schools. It is intersected by the Ohio and Mississippi railroad, which passes through the capital, Olney. IV. A S. W. co. of Wis., bordered S. by Wisconsin river, and drained by Pine river and Knapp's and Mill creeks; area, 576 sq. m.; pop. in 1860, 9,733. It has a generally level surface and a fertile soil. The productions in 1850 were 1,683 bushels of wheat, 11,095 of Indian corn, 2,515 of oats, and 1,956 of potatoes. Capital, Richland Centre.

**RICHMOND.** I. The southernmost co. of N. Y., comprising Staten island, Shooter's island at the entrance of Newark bay, and the islands in Staten Island sound; area, 58½ sq. m.; pop. in 1860, 25,498. It is separated from Long island by New York bay, the Narrows, and the harbor of New York; on the N. from New Jersey by the Kill Van Kull and Newark bay, and on the W. by Arthur Kill or Staten Island sound. Raritan bay lies along the S. and part of the S. E. shore. Several small bays are on the S.

shore. A range of hills, reaching a maximum height of 310 feet, extends across the island, and the rest of the surface is undulating. It is the residence of a large number of citizens engaged in business in New York, with which city it is connected by ferry boats. The surrounding waters contain valuable oyster beds, and the trade employs a large portion of the stationary population. The productions in 1855 were 76,600 bushels of wheat, 15,991 of oats, 43,087 of Indian corn, 21,739 of potatoes, 7,032 tons of hay, and 24,865 lbs. of butter. There were 8 newspaper offices, 30 churches, and 8,133 pupils attending public schools. It is the seat of the sailors' snug harbor, founded by Robert Richard Randall by will dated June 1, 1801, according to which a large and valuable property was appropriated for the maintenance of aged and infirm mariners. The property was allowed to accumulate until 1880, when the site, 163 acres, was purchased, and the erection of the buildings commenced. It has an annual income of \$75,000, and supports about 400 inmates. There are also a seamen's retreat, an establishment for the relief of mariners' families, and a society for the relief of destitute children of seamen. There are several defensive works, including Fort Richmond, Fort Tompkins, and batteries Hudson and Morton. At the N. extremity is a quarantine establishment, efforts for the removal of which have been made by neighboring residents. The county is divided into the 4 townships of Castleton, Northfield, Southfield, and Westfield. The Staten island railroad, 11 m. long, extends from Vanderbilt's landing to Tottenville near the S. extremity. Capital, Richmond. II. An E. co. of Va., bordered S. W. by Rappahannock river; area, about 175 sq. m.; pop. in 1860, 6,856, of whom 2,466 were slaves. It has a nearly level surface and fertile soil. There are extensive forests of pine, and the waters abound with oysters. The productions in 1850 were 185,800 bushels of Indian corn, 42,404 of wheat, 7,178 of sweet potatoes, 3,741 lbs. of tobacco, and 6,458 of wool. There were 9 churches, and 220 pupils attending public schools. Value of real estate in 1856, \$1,261,657, showing an increase since 1850 of 23 per cent. Capital, Warsaw. III. A S. co. of N. C., bordering on S. C., bounded W. by the Yadkin river and Abbat's creek, and N. E. by Lumber river; area, about 900 sq. m.; pop. in 1860, 11,009, of whom 5,453 were slaves. The productions in 1850 were 225,017 bushels of Indian corn, 56,804 of sweet potatoes, 14,808 of wheat, and 3,810 bales of cotton. There were 17 churches, and 903 pupils attending public schools. Capital, Rockingham. IV. An E. co. of Ga., separated from S. C. by the Savannah river, and drained by Brier, Butler's, McBean's, and Spirit creeks; area, about 350 sq. m.; pop. in 1860, 21,284, of whom 3,389 were slaves. It has an uneven surface, and the soil is fertile near the streams. The productions in 1850 were 297,780 bushels of Indian corn, 27,458 of oats, 51,045 of sweet

potatoes, 9,413 lbs. of rice, and 1,087 bales of cotton. There were 3 grist mills, 19 saw mills, 1 cotton factory, 2 woollen factories, 2 foundries, 10 newspaper offices, 14 churches, and 720 pupils in public schools. The Augusta and Savannah and the Georgia railroads intersect the county, terminating at the capital, Augusta.

RICHMOND, a city and the capital of Virginia and of Henrico co. at the head of tide water, and at the lower falls of James river, about 150 m. from its mouth, in lat.  $37^{\circ} 32' 17''$  N., long.  $77^{\circ} 27' 28''$  W.; pop. in 1860, 87,910. The city occupies a most picturesque situation, being built on Richmond and Shockoe hills, which are separated by Shockoe creek, and surrounded by beautiful scenery. It is regularly laid out and well built, the streets, which are lighted with gas, crossing each other at right angles. On Shockoe hill are the state capitol and other public buildings. The capitol stands in the centre of a park about 8 acres in extent. It is a large and imposing edifice, having at one end a handsome portico, and contains in its central hall Houdon's celebrated statue of Washington, and near by a marble bust of Lafayette. A splendid monument by Crawford was here inaugurated Feb. 22, 1858. It is the largest in the United States, and consists of a basement in the shape of a star with 6 points, upon each of which will be a statue of some eminent Virginian, the statues of Patrick Henry and Thomas Jefferson by Crawford being already in position; the pedestal, an elaborate structure, 42 feet high from the ground; and upon this a colossal equestrian statue, in bronze, of Washington, 25 feet high. The pedestal is ascended by winding stairs within. With what remains to be done the cost of the monument will exceed \$100,000. On the E. of the square is the governor's mansion. The city has a court house, county and city gaol, the state penitentiary, 300 feet in front and 110 deep, an orphan asylum, almshouse, theatre, museum, 3 banks, 3 savings banks, 3 insurance companies, 4 daily and 9 weekly newspapers, and 23 churches, viz.: 1 African, 4 Baptist, 1 Campbellite, 4 Episcopal, 1 Friends', 2 Jewish synagogues, 1 Lutheran, 4 Methodist, 3 Presbyterian, 1 Roman Catholic, and 1 Universalist. It is the seat of Richmond college, an institution under the direction of the Baptists, founded in 1840, and having in 1860 7 instructors and 93 students; St. Vincent's college, under the control of the Roman Catholic clergy; and the medical department of the Hampden Sidney college. There is also, among other associations, the Virginia historical and philosophical society. Richmond is supplied with water from 3 large reservoirs, each of 1,000,000 gallons capacity, and filled by two force pumps. The falls of James river afford immense water power, and there are many extensive factories, including 4 cotton and about 50 tobacco factories, flour mills, rolling mills, forges, furnaces, machine shops, &c. For the year ending June 30, 1859, its exports were \$6,682,258, imports \$778,578; clearances 142,

tonnage 53,377; entrances 47, tonnage 7,858; the tonnage of the district was 12,047. Vessels drawing 10 feet can ascend to within a mile of the centre of the city, at a place called Rockets, and those of 15 feet draught to Warwick, 8 m. below. A canal has been built around the falls, and above them there is navigation for over 200 m. The James river and Kanawha canal, intended to extend to Covington, is completed for about 200 m. It has very extensive railroad communication, being the terminus of 5 roads, running to Fredericksburg and the Potomac, to Petersburg, to Danville, Va., to Jackson's river by the central railroad, and to York river.—Richmond was founded in 1742, and became the state capital in 1779, at which period it was a small village. Seven years later it had increased to about 300 houses, and in 1800 its population was 5,737. On the night of Dec. 26, 1811, the theatre took fire while crowded with spectators, of whom upward of 70 perished in the flames, among them the governor of the state. A church has since been erected on the site. In June, 1861, Richmond was made the seat of government for the "Confederate States of America," whose congress assembled there on July 20.

RICHMOND, a town of Wayne co., Ind., on the E. fork of Whitewater river, here crossed by the Indiana central railroad, and the terminus of the Cincinnati, Eaton, and Richmond railroad, 42 m. from Columbus, 68 m. E. from Indianapolis, and 70 m. N. W. from Cincinnati; pop. in 1860, 6,603. The river affords abundant water power to a number of manufactories of cotton, wool, flour, &c., and it is the centre of a very productive and populous district. It contains 1 bank, 3 newspaper offices, and 11 churches.

RICHMOND, a town in Surrey, 10 m. from London, pop. 9,065, remarkable for a royal palace where Queen Elizabeth died, demolished during the commonwealth. The park (2,468 acres) is renowned for its picturesque scenery, and with Richmond Hill, a wooded eminence overlooking Twickenham and the valley of the Thames, has been the theme of English descriptive poetry since the days of Pope and Thomson, who both lived in its vicinity.

RICHMOND, COUNTESS OF. See BEAUFORT, MARGARET.

RICHMOND, LEIGH, an English clergyman, born in Liverpool in 1772, died at Turvey, Bedfordshire, in 1827. He was educated at the university of Cambridge with a view to the bar, but, preferring the church, was ordained in 1797, became a curate in the Isle of Wight, and in 1805 chaplain of the Lock hospital, London, and in the same year was presented to the rectory of Turvey. He was distinguished as an evangelical preacher, and wrote "Annals of the Poor," including the celebrated story of the "Dairyman's Daughter." He also published "The Fathers of the English Church, or a Selection from the Writings of the Reformers and Early Protestant Divines of the Church of England" (8 vols. 8vo., 1807-'11). His life has



been written by the Rev. T. S. Grimshawe, S. B. Wickens, and the Rev. G. T. Bedell.

RICHTER, JOHANN PAUL FRIEDRICH, commonly known by his literary name of Jean Paul, a German author, born in Wunsiedel, near Baireuth, March 21, 1763, died in Baireuth, Nov. 14, 1825. His father was organist and under teacher in Wunsiedel, but in 1766 was called to be pastor of the church in Joditz, and subsequently to the larger parish of Schwarzenbach on the Saale. Under his tuition the son acquired the rudiments of his education, eagerly devouring the contents of the few books and periodicals that came in his way, and in 1779 entered the gymnasium of Hof. Not long afterward his father, whose later years had been burdened by a constantly increasing load of debt, died, leaving to his wife and children an incumbered estate. Richter however remained at school, and in 1781 was matriculated at the university of Leipsic. There the evil days so long threatening came upon him in all their bitterness. During the years of misery and want which followed, it was not so much a question as to how he should live, but as to whether he should live at all. He abandoned all idea of studying for the church, for which he had been destined by his father, and under the sharp pressure of hunger composed his first work, "The Praise of Stupidity" (*Das Lob der Dummheit*), modelled upon the *Moria Encomium* of Erasmus. For this he could obtain no publisher, and Richter, forgetting, as he says, what the world would forget, resolutely applied himself, while envired by "unpaid debts and unsold boots," to the composition of a volume embracing a series of satirical sketches under the title of "Greenland Law-suits" (*Grönländische Prozesse*, 2 vols., Berlin, 1783-5). This work found for its author of 19 a publisher but not a public, and in 1784 Richter fled from Leipsic from debt for scanty food to his mother's residence in Hof, which law-suits had reduced to "a house containing one apartment." In 1786 he went to Töpen as the tutor of a son of Herr von Oerthel, and the 3 years he spent there were rendered exceedingly gloomy by the stupidity of his pupil, and the avarice and arrogance of his employer. The death of an intimate friend prompted him to write the essay entitled *Was der Tod ist* ("What Death is"), which he sent to Herder, into the hands of whose wife it chanced to fall, and was the means of afterward securing him great benefits. In 1786 he went to Schwarzenbach, and there spent 4 years in teaching. This was one of the happiest periods in Richter's life, and in a later work upon education (*Levana, oder Erziehungslehre*, Brunswick, 1807) he has given a detailed account of the peculiar method of instruction pursued in his school. It was not until 1788 that he found a publisher for his third work, "Selections from the Papers of the Devil" (*Auswahl aus des Teufels Papieren*, Gera), and it met with but few readers. But by 1790 the worst of his long struggle with

poverty was over. In that year appeared the "Invisible Lodge" (*Die unsichtbare Loge*, 2 vols., Berlin, 1793), which he was wont to call his pedagogical romance, and which was based upon his own experience in teaching. The romance was unexpectedly successful, and the author was encouraged to go on with the composition of *Hesperus* (4 vols., Berlin, 1794), the work by which he is best known out of Germany. Following this appeared *Quintus Fixlein* (Baireuth, 1791), translated into English by Carlyle, and "Flower, Fruit, and Thorn Pieces" (*Blumen-, Frucht- und Dornenstücke*, 4 vols., Berlin, 1796-7), a collection of pieces, one of which, "The Dream of the Dead Christ," was translated by Mme. de Staël, and first gave Richter a reputation outside of his native land. His fame was now spreading rapidly, and at the invitation of Charlotte von Kalb, a noble lady of Weimar, who became the original of Linda in his novel of "Titan," he visited that city, then the residence of many of the most accomplished men of Germany. By Herder and Wieland he was received with great affection and admiration, but he did not at that time much attract the favor of Goethe or of Schiller, whom he called upon in Jena. After his return to Hof, he received several invitations to teach, one from the princess of Hohenlohe, who wished him to take charge of her two sons. He said in his answer that he was henceforth determined to educate no children but his own (his books), and that he had so much to say that if death should surprise him at his writing table in his 80th year, it would yet be too early. Two minor novels, "The Parson in Jubilee" (*Der Jubelsenior*, Berlin, 1797) and *Das Campanerthal* (Erfurt, 1798), a treatise on the immortality of the soul, followed. The death of his mother in 1797 led him to give up his residence in Hof. He first went to Leipsic, but the literary attractions of Weimar soon drew him to that city, and from there in 1800 he removed to Berlin. He was now the favorite of the educated society, and especially of the educated women, of Germany. By the latter he had been first appreciated, and by them he had in great measure been lifted into fame. Yet, at a time when French ideas of marriage had to a great extent corrupted German society, he preserved his purity of life, and among all the women, according to the statement of his biographer, who would have left at his call lover or husband, not one had suffered in reputation on his account. With the brilliant Charlotte von Kalb, who had sought a divorce in order that Richter might marry her, or with more preciseness perhaps that she might marry him, his intimacy had declined because of her loose views in regard to the sanctity of the marriage relation. In May, 1800, he was married to Caroline Meyer, daughter of a privy councillor at Berlin, a union which turned out happily in every respect. The first years of his wedded life were spent in Meiningen and Coburg. In 1803 appeared the last volume of "Titan" (4

vols., Berlin, 1800-'3), which had been begun at Weimar during his first visit, and is deemed throughout Germany his great work, at least by those who understand it. After this followed the *Flegeljahre* (4 vols., Tübingen, 1804-'5), a title which Carlyle translates "Wild Oats." In 1804 he settled in Baireuth, and spent the remainder of his life in that place, in which he had for years longed to live. In 1808 he obtained from Dalberg, prince primate of the confederation of the Rhine, a pension of 1,000 guilders, which placed him in comfortable circumstances. Happy in his wife and children, he spent the following years in literary labors, and the quiet of his life was only disturbed by occasional travels. The death of his son Max at Dresden in 1821 cast a shadow over his last years, and his depression was increased by the failure of his sight, which prevented him from finishing the books he had begun. He however occupied himself with the revision of his works, and with his autobiography, but the latter was carried down only to his 13th year. His works collected by himself embrace 65 volumes, and to these 5 supplementary ones were added (Berlin, 1826-'38).—The character of Richter's writings was so peculiar that he was named by his panegyrists *Jean Paul der Einzige*, "Jean Paul the Only One." He is the greatest of the German humorists, but his language is so involved, his sentences are so perplexed, and so dislocated by parentheses and elisions, that he is unquestionably the most obscure author of modern times. So intricate is he, that about 1810 a work was undertaken for the benefit of Germans, with the following title: "K. Reinhold's Lexicon for Jean Paul's Works, or explanation of all the foreign words and unusual modes of speech which occur in his writings, with short notices of the historical persons and facts therein alluded to, and plain German versions of the more difficult passages in the context; a necessary assistance for all who would read those works with profit." In his philosophy Richter was an adherent of Herder and Jacobi, being intensely opposed to the idealism of Fichte, which he satirized in several of his works. Carlyle has given an account of his life and writings in two of his essays, and his autobiography translated and continued by Eliza Buckminster Lee appeared at New York in 1842.

**RICKETS** (*rachitis*), a disease of children characterized by an arrest of ossification, and leading to deformity, chiefly of the lower limbs. Rickets is a disease of early childhood; rarely occurring before the child is 12 months old, it is in the course of the 2d year that the disease commonly first shows itself. It is most frequent among those who inherit unhealthy constitutions, who are ill fed or confined to a damp and badly ventilated atmosphere. According to Trousseau, 90 out of every 100 children affected with rickets have been either brought up entirely by hand or have been prematurely weaned. Very frequently the disease supervenes on some

exhausting and long continued illness. Trousseau thinks the tardy evolution of the first teeth is indicative of a tendency to rickets. The first symptom of the complaint is an enlargement of the joints, the wrists, knees, &c. Afterward the long bones, particularly those of the lower extremities, give way under the weight of the body, and become bent, sometimes in one, sometimes in another direction; often the ribs are pressed in and the sternum pushed outward, making the child what is termed chicken-breasted; the bones of the pelvis and those of the spine become variously bent and deformed. The deformity of the chest produced in this manner may be so great as to seriously interfere with the functions of the heart and lungs. The bones of the head are never deformed, though rachitic children have frequently large heads and the fontanelles are late in closing. During the progress of the disease the patient is pale, languid, and with deficient or irregular appetite. The disease is very rarely fatal; after an uncertain period the appetite returns, the child recovers strength and flesh, and the bones attain their natural firmness; in after life the bones affected are found to be unusually hard and compact.—The treatment of rickets is mainly hygienic; a nutritious, digestible diet, fresh air, suitable clothing, and passive exercise are its main elements. Tonics and chalybeates may be required, and the tepid salt water bath may be found useful. Phosphate of lime is a useful remedy.

**RICKMAN, THOMAS**, an English architect, born in Maidenhead, June 8, 1776, died March 4, 1841. He was the son of a surgeon and apothecary in his native town, and while engaged in commercial pursuits at Liverpool devoted his leisure to studying architecture, and finally took the first prize for a design for a church about to be built. He now established himself at Birmingham, built edifices in almost every county of England, and at his death had probably designed more Gothic churches than any other architect. Among his other edifices are the new court and buildings of St. John's college, Cambridge, and the restorations of Rose castle, the palace of the bishop of Carlisle. He was the first to point out the chronological succession of Gothic styles in his "Attempt to discriminate the Styles of Architecture in England."

**RI-COCHET** (Fr.), in gunnery, a method of firing with small charges, at an elevation of from 8° to 6°, in a direction enfilading the face of a work or a line of troops, or toward the hull of a vessel. The rebound causes the shot to pass along the rampart or surface of the ground or water with a motion very similar to that produced by what is popularly called "skipping stones" in the water.

**RICORD, PHILIPPE**, a French physician, born in Baltimore, Md., in 1800. His father had come to the United States in 1790 to repair his fortune, and the son here prosecuted his scientific studies until 1820, when he went to

Paris, finished his medical education, and in 1826 received his degree. He first practised at Olivet, afterward at Orleans, and later at Croûty-sur-Oureq. In 1831 he became surgeon-in-chief of the *Hôpital du midi* at Paris, at which he still continues. Ricord has the largest practice in all Paris, has been a member of the imperial academy (section of surgical pathology) since 1850, is a member of the society of surgery, and is attached as a consulting surgeon to the dispensary of public health. He has specially devoted himself to venereal diseases, and has introduced many novelties in their treatment. He is an officer of the legion of honor, and is honored with the decorations of very many European orders. His works on diseases of the genital organs are important, and have gained him a wide-spread reputation.

RIDLEY, NICHOLAS, an English bishop, born at Wilmontswick, Northumberland, about 1500, burned at the stake in Oxford, Oct. 16, 1555. He was graduated at Pembroke hall, Cambridge, in 1518, and in 1524 took holy orders. In 1527 he went to study at the Sorbonne, and remained abroad until 1529. On his return to Cambridge he was chosen under treasurer of the university. His learning and eloquence attracted the attention of Cranmer, archbishop of Canterbury, who made him his domestic chaplain, and in 1540 he was elected master of his college. He preached against the use of images and holy water, and gradually became a strenuous supporter of Protestant doctrines. He was accused at the instigation of Bishop Gardiner of preaching against the six articles, and the accusation being referred to Cranmer, he was acquitted. In 1545 he was made a prebendary of Westminster, and in 1547 bishop of Rochester. He sat on the commission that deprived Bonner of the bishopric of London, and was appointed his successor; and he also shared in the deposition of Bishop Gardiner. He assisted Cranmer in preparing the 41 articles. Having sought an interview with the princess Mary, he expressed his views very freely, and requested permission to preach before her, which was peremptorily refused. Moved by a sermon of Ridley's, Edward VI. converted Grey Friars and St. Bartholomew's priories, with their revenues, into charitable institutions, and his own house of Bridewell into a compulsory workhouse for such as were in distress through wilful idleness. In a sermon preached at St. Paul's Ridley espoused the cause of Lady Jane Grey, and warned the people of the evil that would follow to Protestantism if Mary should come to the throne. On Mary's accession he was at once arrested and committed to the tower (July, 1553), and in April, 1554, was taken to Oxford, to attend a discussion on the real presence. Upon its close Cranmer, Ridley, and Latimer were adjudged obstinate heretics. Ridley was then confined at Oxford, and after many attempts had been vainly made to induce him to recant, he was led to the stake with Latimer, and burned to

death. His works were collected by the Parker society (1 vol. 8vo., 1841).

RIEDELSE, FRIEDRICH ADOLPH, baron, a German officer, born in Lauterbach, Hesse-Darmstadt, June 3, 1738, died in Brunswick, Jan. 6, 1800. He early joined the army as ensign, and with his regiment spent two years in England. During the 7 years' war he served in Germany under Prince Ferdinand of Brunswick, and in 1767 became adjutant-general of the Brunswick army. In 1776 he was made major-general, and assigned to the command of the corps of Brunswickers, 4,000 strong, furnished to Great Britain for the war in America. Arriving at Quebec June 1, he remained a year in Canada, until the organization of Burgoyne's expedition. He gave active aid in the taking of Ticonderoga (July 6, 1777), secured the British victory at Hubbardton the next day by bringing up reinforcements, and shared in the subsequent movements of Burgoyne until his surrender at Saratoga, Oct. 17. He afterward resided on parole in various parts of the country until the autumn of 1780, when he was exchanged and assigned to a command on Long island. In Sept. 1781, he was transferred to Canada, and returned to Germany in Aug. 1783, with 2,800 of his 4,000 Brunswickers. From 1788 to 1793, as lieutenant-general, he commanded the Brunswick contingent sent to Holland to support the cause of the stadtholder, and in 1794 was appointed commandant of the city of Brunswick.—FREDERICA, wife of the preceding, born in 1744, died in Berlin, March 29, 1808, accompanied her husband to America, and wrote graphic descriptions of the campaign and subsequent events, published after her death by her son-in-law, Count von Reuss, and translated into English ("Letters and Memoirs relating to the War of American Independence, and the Capture of the British Troops at Saratoga," 12mo., New York, 1827).

RIEGO Y NUÑEZ, RAFAEL DEL, a Spanish revolutionist, born at Tuña, in the Asturias, in 1785, executed in Madrid, Nov. 7, 1823. He served in the Spanish army during the war in the peninsula, and in 1820 appeared in arms near Cadiz, proclaiming the constitution of 1812, which Ferdinand VII. had promised, but never given to the people. Amid many adverse circumstances he succeeded in rousing the provinces to action, and was hailed as the "apostle of the constitution." He was appointed a deputy to the cortes of 1822, of which body he became president, and displayed in this position great firmness and moderation. When Ferdinand refused to maintain the new constitution Riego again took up arms, was made prisoner after the surrender of Cadiz to the duke d'Angoulême, and became one of the first victims of the absolutist party upon their return to power. His body was quartered, and his limbs sent to different parts of the peninsula.

RIENZI, NICOLA GABRINI, commonly called COLA DI RIENZI, the last of the Roman tribunes, born in Rome about 1810, assassinated

Oct. 8, 1354. He was by profession a notary, of obscure birth (although he claimed illegitimate descent from the imperial house of Luxembourg), well educated, of imposing presence, and gifted by nature with extraordinary powers of eloquence. The removal of the papal see to Avignon in the early part of the century had left Rome a prey to contending factions of nobles, whose houses were fortified castles, and whose armed dependants kept the city in a constant turmoil; and the people, finding no redress from violence and license, had become a demoralized rabble. Rienzi nevertheless attempted to arouse in them a resolution to be free. Upon the accession of Clement VI. in 1342 he had become of so much importance as to be included in the deputation sent from Rome to Avignon to urge the pope to return to his see; and the latter was so charmed by the eloquence of the young notary, that he desired to hear him every day. Petrarch also, who headed the deputation, here conceived an admiration for Rienzi, to whom he afterward addressed the ode commencing *Spirto gentil*. The pope, however, showed no disposition to revisit Rome, and Rienzi, despairing of any alleviation of the public calamities through the ecclesiastical power, proceeded by flattering and deceiving the nobles to disarm their suspicions. Like his prototype Brutus, to whom Gibbon compares him, he submitted to various kinds of indignity to advance his end, and, in his own words, "made himself a simpleton and a stage player, and was by turns serious or silly, cunning, earnest, and timid, as the occasion required." His popular appeals meanwhile were continued with energy, and at midnight meetings on the Aventine hill he spared none of the resources of oratory to inflame his audience. The hour for action having arrived, on the day after Ash Wednesday, 1347, he caused a scroll to be affixed to the doors of the church of San Giorgio in Velabro, on which was inscribed: "Ere long Rome will return to her good estate." On the succeeding vigil of Pentecost, the festival of the effusion of the Holy Ghost, the people were summoned by the sound of the trumpet to repair to the capitol on the following day. Rienzi passed the night in the church of St. Angelo, where he heard the thirty masses of the Holy Ghost, by whom he said his acts were inspired, and at 10 in the morning issued forth in complete armor, bare-headed, and surrounded by a band of 25 sworn confederates. By his side was the bishop of Orvieto, the pope's vicar, and he was followed by a guard of 100 men-at-arms. The procession, escorted by shouting multitudes of citizens, ascended the capitol, where the laws of the good estate were read to the people. They provided for the public security in general. A guard was ordered to be maintained for the protection of the citizens, and of the shipping and commerce on the Tiber; the right of the nobles to keep strongholds within the city was abolished; all

places of defence were to be delivered to the delegates of the people; granaries were to be established; the poor were assured of alms; and the magistrates were bound to administer justice according to law. The people adopted the constitution by acclamation, and Rienzi, being invested with power to establish the good estate, assumed the title of tribune in the following words: "Nicholas, by the grace of Jesus Christ, the severe and merciful, tribune of freedom, peace, and justice, the deliverer of the Roman republic." The nobles, awed by this sudden revolution, surrendered their fortresses, and gave in their submission. The haughty old Stephen Colonna threatened at first to throw the tribune from the windows of the capitol, but was compelled, with the rest of his family, to take an oath to obey the laws of the good estate. The new dispensation which succeeded the long reign of anarchy and tyranny seemed to the people little less than miraculous; and in view of the order and tranquillity which soon prevailed throughout Rome and her dependencies, Rienzi seemed justified in his exultant boast: "It was hardly to be believed that the Roman people, till now full of dissension and corrupted by every kind of vice, should be so soon reduced to a state of unanimity, to so great a love of justice, virtue, and peace, that hatred, assaults, murder, and rapine should be subdued and put an end to." To add to his importance, embassies from Florence, Perugia, Sienna, and many other cities of Italy repaired to Rome to congratulate the tribune on his good work, and to offer him substantial assistance; and several powerful Christian sovereigns paid him equal deference. He himself sent an embassy to the pope to ask his approbation of the reforms he had consummated in the holy city; and as an evidence of his submissive reverence for the papal authority, he associated the bishop of Orvieto in office with him, taking care however that the honor should not be accompanied by any control of the affairs of government. But while at the height of his greatness, Rienzi began to show symptoms of that vanity which ultimately caused his ruin. He strove to augment his importance by processions, ceremonious pageants, and public spectacles; spared nothing which would minister to his pomp and private luxury; and, aping the manners of royalty, caused himself and his wife to be waited upon by the lords and ladies of his court. On Aug. 1 he was knighted in the Lateran church, and after the performance of the ceremony summoned all potentates, ecclesiastical or secular, who presumed to contest the prerogative of Rome to elect the emperor, to appear in the city at the ensuing Pentecost. The papal vicar attempted in vain to interpose; his voice was drowned in the noise of the trumpets and the shouts of the multitude. On Aug. 15 he capped the climax of his folly by causing himself to be crowned in the church of Sta. Maria Maggiore with 7 crowns,

symbolizing the 7 gifts of the Holy Ghost, under whose special influence he still claimed to act. On the same day he was alarmed by the prediction of Fra Guilielmo, one of his most zealous supporters, of his approaching downfall. His splendid processions gradually palled upon the public taste, and the populace began to murmur at the large expenditures from the public treasury to support the extravagance of their tribune. The nobles, whom he alternately threatened and caressed, finally banded together to accomplish his overthrow, and, having recovered a number of their strongholds, appeared in arms before the city. By the imprudence of his enemies he gained a victory as surprising to himself as to others, and more than 20 of the Colonnas, Orsinis, Savellis, and other noble families perished in battle or in flight. His pride now became more offensive than before, and instead of following up his advantages, he allowed his enemies to gather strength while he wasted his time in idle pageantries. The pope declared against him, and the people, alarmed by their rapidly increasing taxes, broke forth into open murmurs, which he was unable to quell, notwithstanding he restricted his extravagance, and dropped his most ostentatious titles. At this juncture the freebooting count of Minorbino entered the city and fortified himself in one of the palaces of the Colonnas, whence he refused to retire when summoned by Rienzi. The latter called the armed citizens to his assistance, and, meeting with no response, solemnly abdicated his power, and took refuge in the castle of St. Angelo, whence at the end of a month he escaped in the disguise of a monk, Dec. 15, 1347. He took refuge among the devout Franciscans who dwelt in the fastnesses of the southern Apennines, with whom he remained 2½ years as a tertiary of the order. During the jubilee celebrated in 1350 he is said to have appeared in the disguise of a pilgrim among the multitudes who flocked from all parts of Christendom to Rome; and soon after, at the instigation, he tells us, of Fra Angelo, an inspired hermit, who informed him that the Father and the Son had ceased to rule in the world, and that the age of the Holy Ghost was at hand, he repaired to the court of Charles IV. at Prague, and exhorted him, in accordance with the prophecy of Fra Angelo, to undertake the conquest of Italy, in which he assured him none could be of so much service as himself. The emperor, amazed at the ambitious schemes and the heretical doctrines broached by Rienzi, ordered him into custody, and finally sent him a prisoner to the pope at Avignon, where he was closely guarded, although allowed the perusal of his favorite Latin authors. A commission of ecclesiastics was appointed to try him, but their labors seem never to have been prosecuted with energy. Meanwhile Rome had returned to its former state of anarchy, and Innocent VI., the successor of Clement, determined, as a means of restoring the papal au-

thority in the city, to send Rienzi thither. The latter gladly undertook the mission, and in the summer of 1354 reentered Rome in the capacity of senator, by the appointment of Cardinal Albornoz, the papal legate. Unwarned by adversity, he returned to his old pomp and luxury, and, in place of the just and equal rule which had marked the era of the good estate, established an unmitigated tyranny. He became, in the language of one of his contemporaries, "an inordinate drunkard," and was defied by the refractory Colonnas in their castle of Palestrina, against which he conducted a tedious and expensive but unavailing siege. The execution of Fra Moneale, a well known captain of a free company, from whose family he had received pecuniary assistance, and whose property he appropriated to his own use, filled the citizens with horror; and upon his attempting to levy a fresh tax to pay his troops, a popular insurrection burst forth. Rienzi took refuge in the capitol, and, being deserted by his guards, attempted to appease the excited crowd who surrounded the place. He appeared upon a balcony in armor, grasping the standard of the people, but was driven back by a shower of stones. Finally, in the disguise of a doorkeeper, he was arrested and led to the foot of the capitol stairs, where, while in the act of addressing the people, he was run through the body by Cecco del Vecchio, an artisan, who feared the effect of his eloquence. He was forthwith despatched by a hundred weapons, his head cut off, and his body treated with shameful indignities.—An important series of letters, addressed by Rienzi to the emperor and the archbishop of Prague after his first fall, and vividly illustrating his character, was discovered by Pelzel, the historian of Bohemia, in the last century, and has been published in German by Dr. Papencordt under the title of *Cola di Rienzi und seine Zeit* (Hamburg and Gotha, 1841). Some of them are given in Hobhouse's "Illustrations to Childe Harold." The story of Rienzi forms the groundwork of one of Bulwer's best known novels.

RIES, FERDINAND, a German composer, born in Bonn, Nov. 29, 1784, died in Frankfort, Jan. 13, 1838. At the age of 17 he was instructed for a brief period by Beethoven, being the only pupil ever received by that composer. Subsequently he made professional visits to Munich, Paris, St. Petersburg, and other cities, but met with only moderate success. He first brought himself prominently into notice in England, where between 1813 and 1824 his symphonies were performed with great applause. In 1824 he returned to Germany, where he passed the remainder of his life. He is the author of the "Brigand's Bride" and "Liska," operas; of "David," an oratorio; of 6 symphonies, and a great number of overtures, sonatas, &c.

RIESENGBIRGE, or GIANT MOUNTAINS, a range of mountains separating Prussian Silesia from the Austrian province of Bohemia, being the continuation to the E. of the river

Elbe of the range already described on the W. of that river under the name of Erzgebirge. From the Elbe the Riesengebirge pursue an E. course, gradually inclining toward the S. E. until they are merged in the Sudetes chain, the continuation of the same mountainous belt. The Riesengebirge maintain the same general geological structure with the Erzgebirge, the rocks being chiefly of the metamorphic slates and granites, and productive in a similar variety of valuable ores. Those of iron are especially abundant, and some of the earliest establishments for producing that metal were in this region. The highest summits occur in this portion of the belt, and among them the following are most conspicuous: the Schneekoppe or Riesenkoppe, 5,060 feet high; Kleino Sturmhaube, 4,400 feet; Grosse Sturmhaube, 4,540 feet; Hohe Rad, 4,657 feet; and the Reifträger, 4,280 feet.

RIETSCHEL, ERNST, a German sculptor, born in Pulsnitz, Saxony, Dec. 15, 1804. He studied under Rauch and in Italy, and establishing himself in Dresden was appointed professor in the academy of fine arts. Among his chief works are a colossal group of "Mary weeping over the Body of Christ;" statues of Lessing, Goethe, Schiller, and Von Weber, attired in the costume of modern times instead of the conventional draperies previously employed by sculptors; "Love taming a Panther;" "Love borne by a Panther;" the "Four Hours of the Day;" busts of Luther and of Augustus II. of Saxony for the Walhalla, &c. He has also executed sculptured ornaments for the Augustus museum in Leipzig, the new theatre in Dresden, and the opera house in Berlin; beside a great number of miscellaneous productions.

RIFLE (Danish, *riffel*, a chamfer or groove), a variety of firearms, of which the barrel is grooved on the inside from the charging chamber in the breech to the muzzle. Gun barrels, it is stated, were furnished with straight grooves as early as the year 1498 in Vienna; but the object of these was merely to furnish a space for receiving the residues of combustion, and facilitate the loading by lessening the friction when the ball is pushed down. True rifling is giving a spiral turn to the grooves, which may be of any number, and may extend partially round the barrel, or once, twice, or several times, in its length. They may be of the same pitch or degree of curvature throughout, as is commonly the case, or the twist, if desired, may increase in curvature toward the muzzle. This form, however, has no advantage unless it might be for very short barrels. It is essential that the grooves should be of the same curvature—all exactly parallel. Their object is to impress upon the tightly fitting bullet a rotating motion round its axis of progression, and thus keep it in a straight line as it spins forward. The motion of a top held upright while it is rapidly spinning illustrates the principle of the rifle. It is to be observed, that in

order for the grooves to take hold of the ball and cause it to rotate, this must either be made with corresponding projections fitting the grooves, or it must be of soft metal like lead and of larger diameter than the bore of the piece, so as to be forced into the depressions. Either of these conditions involves great difficulties in construction or in practice, and the efforts to overcome them, steadily pursued of late years, have resulted in the great perfection of modern rifled arms. It was within less than 20 years after the first use of straight grooves that a spiral turn was given to the grooves, and bullets were made with projections to fit them. Unless the pieces were breech-loading, the use of the projectiles must have been attended with difficulty, particularly after firing a few times, and the barrel had become foul. The projections, moreover, must have seriously affected the straight flight of the bullet, if, as is probable, the grooves were large and deep. Little is known of these guns, and the principle appears to have soon fallen into neglect. During the 17th century rifled arms were in use in several countries on the continent of Europe, and P. Daniel, speaking of their employment by the French carabiniers in 1692 (*Histoire de la milice Française*), alludes to the invention as old. The ancient pieces of which we have knowledge, as the rifled cannon of 13 grooves of the date of 1664, preserved at Berlin, which is breech-loading, the breech secured by means of a screw, and another at Munich having 8 grooves and a bore of about 2 inches, are of such size that the projectiles were no doubt leaden balls; and the principle appears never to have been extended to guns of large caliber, whose chief service was for battering, for which balls of soft metal are evidently unsuitable. For this reason, it is probable, the English made little use of rifled cannon in the American revolutionary war, although it is known they had 2-pounder pieces, which with a range of 1,300 yards gave a lateral deflection of only 2 feet, far surpassing in range and accuracy any other pieces of that date. It is stated that in 1776 they even used elongated bullets, and had employed conical bullets as far back as the siege of Rochelle in 1627. Still the smooth bore continued almost exclusively in use in Europe for small arms as well as cannon. Arms of this character were more easily loaded, and consequently more rapid discharges were kept up with them, which appears to have been considered particularly important at that period, when it was not the general custom in warfare to take careful aim in firing. In the revolutionary war corps of riflemen were organized in the American army, and their skilful use of the rifle, then for the first time regularly adopted in warfare, gave to the foreign troops who encountered them costly evidence of its efficiency. From that period it began to be introduced in European armies, and in the last century a few German and English battalions were equipped with rifles. Napoleon, how-



ever, discouraged their use in his army, and hence they were naturally held in little esteem by other European governments. The Swiss alone in Europe fully appreciated their good qualities, and the backwoodsmen of the United States held to them as their most valued arms. And yet in the middle of the last century a scientific Englishman, Benjamin Robins, author of "New Principles of Gunnery" (1742), devoted much attention to the rifle, perfectly comprehending its superior qualities. He devised a new form of bullet in egg shape, the larger end and centre of gravity of which was forward, which however did not succeed in practice. He refers to breech-loading rifles designed for expediting the loading as in use in England, though not elsewhere to his knowledge. They were made to receive the powder and ball through an opening in the side of the barrel, which was then closed by a screw. The chamber was larger than the bore of the piece, and the balls when forced through in firing were elongated to greater length than that of some of the projectiles now used. No one at that period attained so thorough acquaintance with the principles of firearms as Robins, and his observations upon the rifle show a remarkable appreciation of its importance. Whatever state, he observes, should adopt its use and become proficient in it, must acquire a decided military superiority. A prominent obstacle to its use was the difficulty of introducing the ball larger than the bore, which, as before remarked, is essential to prevent its flying out without following the grooves, technically known as "stripping." The force applied through the ramrod to drive it home flattened the head of the ball, and gave it an unfavorable shape for accurate flight, beside involving much labor in loading. To render its motion easier and still retain the perfect fit, the practice became general wherever the rifle was used to load it by first laying over the muzzle a patch or square piece of linen or thin leather greased on its under side, placing upon this the ball, and driving them both together down upon the powder. The long range of the rifle led to its adoption by the French in the Algerian war, the smooth-bore muskets then in use being no match for the long guns of the Arabs. Some improvements in the bullet, commencing with that of M. Delvigne in 1826, soon rendered it far superior in execution to the old rifle, and at last led to its general introduction in the European armies. The character of these improvements as applied to small arms will be considered before treating of the extension of the principle to heavy ordnance. The invention of Delvigne consisted in the construction of a chamber for the powder of smaller diameter than the rest of the barrel, and opening into this by a square shoulder all around the bore. The ball, of such size as would drop freely down, being introduced into the muzzle and resting on the shoulder, was then rammed by a heavy ramrod till the lead was forced into

the grooves. This form was tried for some years by the royal guard in Algeria, but was at last given up in consequence of the liability of the piece to become foul by the powder lodging upon the shoulders. The balls too were beaten into misshapen slugs which could fly with no accuracy. Col. Thouvenin in 1842 substituted for the depressed chamber a stem of steel which projected into the barrel far enough to contain the charge of powder around it, and it was solid enough to afford a firm support to the ball, which being dropped down upon it was hammered by the ramrod as in the other case. Delvigne then contrived a conical bullet with a cylindrical extension for its base, and also a ramrod hollowed at the end to fit the point of the bullet. This piece is the *carabine à tige* of the French, and is still extensively employed by their infantry, though partially subject to the same objections as Delvigne's chambered rifle. The cylindrical part of the bullet being indented by 2 or 3 deep grooves around the body, the thin edges of these only need be pressed into the grooves in order to secure a tight fit. In England a revived form of rifle with two deep depressions or grooves opposite to each other became for a time very popular. It was provided with a spherical ball cast with a projecting belt around its equator, designed to fit the two grooves. The ball was thus made to take good hold of the twist, so that a whole turn could be given to it in the length of the barrel, instead of a quarter turn to which the old barrels were limited. The shape of the ball was still however a serious defect, greatly inferior to the cylindro-conoid balls of the French. The next great step in improving these was to cause them to expand at the base by the force of the explosion before leaving the barrel, and thus fill the grooves. This invention is claimed by Greener, who states that in 1836 he made oval-shaped bullets on this principle, having a tapering cavity in the rear end into which was inserted a conical plug made of an alloy of lead, tin, and zinc, intended to act like a wedge when propelled by the powder and force out the leaden walls of the bullet into the grooves. A trial made with the bullets by direction of the board of ordnance in 1836 did not prove satisfactory to the officers, and the principle was abandoned; but the subject being brought before parliament in 1857, the claim was admitted and an award of £1,000 was made to Mr. Greener. Had he used the elongated bullet instead of the oval or spherical form, he would undoubtedly have been entitled to the credit of the greatest improvement, which is now awarded to those who combined the extension principle with the best form of bullet. Delvigne appears to have discovered in 1843, according to a paper published by him in August of that year in the *Spectateur militaire*, that without the intervention of any wedge the gases produced by the discharge expand a bullet with a hollowed base more effectually than the blows of the ramrod. In 1847 the invention of Capt. Minié was made

public, and his rifle, or rather his hollowed elongated bullet, was soon after introduced into service in the French army, and in 1851 into the English service. The English army at the battle of Alma was armed with it. The invention consisted in hollowing out the base of the bullet, as had already been done by Mr. Greener, and inserting a small iron thimble of larger diameter than the cavity. This is driven by the discharge into the bullet and forces out its posterior portion to the full extent of the bore of the piece, filling the grooves. It has even been driven completely through the bullet, leaving it behind in the barrel as a hollow cylinder. Various modifications of the bullet have been introduced, and, as now generally practised for the best rifles manufactured in the English armories, it is made to fit loosely in the barrel, and is provided with a plug of hard wood, which fills the external part of the conical cavity in its base. The plug does not appear essential to the bullet, and in the cartridges manufactured in the United States it is generally dispensed with.\*—The Germans, who were also for a long time seeking the best form of rifle and bullet, have adopted the piece called the *Zündnadelgewehr*, and the entire armies of Prussia have been armed with it. It is a breech-loading rifle, constructed with a plunger or slide which may be drawn back from the breech end of the barrel by a stout handle, and the cavity of the breech is then exposed to view, with its upper side open. In this the cartridge is placed, and the slide is pushed back and secured by a catch. In the centre of the front end is a small hole for admitting the steel needle by which the charge is fired, and which exactly fills the hole. This needle is thrown forward when required by the sudden release of a strong spiral spring coiled up behind it on the direct line of the barrel, and which with the apparatus for holding and releasing it constitutes the lock. The ignition is caused by the needle, after penetrating the powder, striking a fulminating composition contained in the base of the conical bullet. A new and important principle is involved in this arrangement of firing the powder at the forward end instead of behind. The bullet thus receives its impulse more gradually, and its inertia is overcome before the full force of the explosion strikes it. Though the difference in time would seem to be utterly insignificant, it is not so by any means; and other methods have been devised of accomplishing this object still more effectively, some of which will be described below. Though greatly approved in Germany, it is objected to the *Zündnadelgewehr* that the cartridges are dangerous to keep in store, as they contain both the powder and the explosive material, and that the pieces are soon apt to become foul and in this state are very difficult to charge.—The established rifles in the English service are the Enfield and Whit-

worth; the Jacob rifle also is a very efficient weapon. The Enfield is so named from the locality of the government manufactory where the rifle is made. After the American system (see Gun), the parts are all made by machinery, the models of which were obtained from the armory at Springfield, Mass., and the corresponding pieces so precisely alike that they may be used without selection to obtain a proper fit. Each barrel is made of a half inch bar of thoroughly forged iron, a foot long and 4 inches wide. This is turned over into a tubular form, and the joint is welded by passing the piece between rollers, by which it is lengthened about 3 inches. The rolling is several times repeated after heating again, until the tube is elongated to about 4 feet and its bore is reduced to about  $\frac{1}{4}$  inch in diameter. The smith work is then completed by cutting off the muzzle, "making up the but," and welding on the nipple lump, when the piece is ready for boring. This is effected by 4 successive operations, the last 2 being made with great care, and finally leaving the barrel to within  $\frac{3}{8}$  of an inch of its diameter when finished. The outside is then ground down to its proper size, and after the barrel is straightened it is tested by a proof charge of 1 oz. of powder and a ball. The nipple screw, nipple, and breech pin are next fitted, and the barrel is bored again, when it is ready for rifling. The grooves, of which there are 8 in the Enfield rifle, are cut separately by a steel cutter at the end of a rod, which is made, by means of a guide in which it turns, to move with exact uniformity of curve from the muzzle to the breech. The depth of the grooves is 0.005 inch at the muzzle, 0.015 at the breech, and their width is 0.262 inch. They make just half a turn in the length of the barrel. After this is completed the barrel is again proved with  $\frac{1}{4}$  oz. of powder and a ball, when it is sighted and finally subjected to the various processes of finishing. The caliber is left of exactly 0.577 inch and the barrel of 3 feet 8 inches in length, weighing 4 lbs. 2 oz., or complete with bayonet 9 lbs. 3 oz. The bullet, made of pure lead, and compressed in dies instead of being cast, is 1.05 inch long, 0.55 inch in diameter (formerly 0.568 inch), and weighs 520 grains. The weight of 60 rounds of ammunition with caps is 5 lbs. 8 oz. The prime cost of the rifle is £2 5s., and the capacity of the manufactory is from 1,500 to 1,800 a week. The rifles are sighted to 900 yards, and good practice may be made at this distance. A rifle is also made of 2 feet 9 inches in length.—The Whitworth rifle is so named from its inventor, Mr. Joseph Whitworth, a very skilful manufacturer of machines and instruments. Its bore is hexagonal, with the corners rounded, and the bullet may be made of the same shape, just fitting the bore, in which case it may be of any hard metal, even of steel, or a cylindrical bullet of lead may be employed, which by expanding will immediately fill out the corners of the hexagon. The

\* The same also appears to be the case with cartridges imported in 1861 from England.

hold upon the bullet is so strong in this form, that a much greater obliquity can be given to the twist, and that adopted is a full turn in 20 inches. This, by causing a more rapid revolution of the projectile, admits its being made much longer, without risk of turning over after it leaves the barrel. Its length is  $1\frac{1}{4}$  inches. The length of the barrel is 39 inches, the smaller diameter of the bore is 0.45 inch, and the larger diameter half an inch. By using projectiles of a hard alloy, as of 9 parts of lead and 1 part of tin, or of still harder material, a remarkable power of penetration is developed, as was shown by sending the bullet through 33 half inch elm boards and into solid timber behind with the ordinary English service charge of powder. The friction caused by the rapid turns of the grooves evidently absorbs a portion of the power generated by the explosion (which, however, is estimated by Mr. Longridge at not more than 2 per cent. of the total force of the powder), rendering more powder necessary in proportion to the area of the cross section of the bullet, as well as greater strength of barrel to withstand the increased pressure. The greater recoil is very perceptible to the shoulder in firing, and limits the charge of powder to a maximum of 120 grains. The bore, it is evident, cannot be enlarged for these reasons beyond its present diameter, which is considerably less than that of the Enfield rifle. The immense strength of the steel barrels prepared for these rifles was well exhibited in the following test made by Mr. Whitworth. Into a barrel an inch in diameter at the breech, and of 0.49 inch bore, he drove down upon the charge, as tightly as possible a leaden plug 18 inches long. On firing this was expanded by the explosion and remained in the barrel, while the gases passed out by the touch hole. The effective range of the Whitworth rifle is given at 2,000 yards or about  $1\frac{1}{4}$  miles, a distance more than equal to the ordinary capacity of the eye to distinguish objects no larger than the body of a man.—Jacob's rifle is made with 4 grooves, of considerable depth and as wide as the "lands" or projecting spaces, making one turn in 36 inches. The bullet, which is cylindrical-conoidal, has projections to fit the grooves. He has also constructed others to be used as shells, and with these ammunition wagons have been exploded at 1,600 and 1,800 yards distance. The bullet is cast with a long tapering cavity extending in from the point, and into this a copper tube is inserted filled with fine grain powder and primed at the point with a detonating composition.—A great variety of rifles have been devised on the breech-loading principle with the design of expediting the loading, and placing bullets of larger diameter than the barrel in the breech end of the piece. The expanding bullet meets these requisites, and admits of the use of the most simple form of barrel unincumbered with the objectionable arrangements for opening it at the breech, which, however well constructed, are always

liable to become fouled in the joints, and after considerable use admit the escape of gases. The breech-loading pieces may be included in three varieties. The first is the revolver, of which Colt's is the best known. The character of this improvement is described in the article Pistol, which weapon of Colt's is constructed upon the same principle as his revolving rifle. It has the advantage of giving several shots in rapid succession; but this is not now considered so important as it formerly was. The next is the hinge variety, which includes the Burnside rifle of Col. A. E. Burnside of the U. S. army, and many others which differ merely in the manner in which a portion of the breech or the barrel is made to turn upon a hinge or pivot, so as to present the chamber for receiving the cartridge. A third variety, including several important rifles, are constructed on the slide system. The Prussian needle gun, as already described, is made on this plan. So also is the American carbine known as Sharps's rifle, a very effective weapon devised by Mr. C. Sharps of Philadelphia, and largely manufactured at his factory near Fairmount in that city. The breech of this is secured by a sliding block of metal or cut-off, which being drawn down near the guard exposes a cavity on the upper side leading into the bore. The cartridge is introduced and the block is pushed up, cutting off the rear end of the cartridge. The carbine of Col. Greene, lately introduced into the English service, also belongs to the slide system. It is provided with two triggers. By pulling the forward one the barrel is unlocked from the breeching, when a twist to the left and a forward pull cause it to slide on a pivot, so that the cartridge may be introduced; the barrel is then immediately returned and locked by a reverse motion. The chamber for the charge contains a sliding tube with its bore in the breech end contracted, so as to present a bevelled or conical surface or shoulder. The force of the explosion acting against this throws the tube back, greatly adding to the tightness of the joint. This rifle, like those employed in the U. S. service, is provided with the Maynard primer, which is a detonating pill or small dot, numbers of which are attached in succession upon a flexible tape-like holder which is coiled up in the breech of the piece and brought forward with each cocking of the lock, presenting a pill upon the end of the nipple. In Greene's carbine the lower end of the nipple tube is extended a little way forward of the breech, so that when the barrel is returned to its place the cartridge is punctured by this tube, which then terminates in the midst of the powder. Another excellent rifle of the slide system is that of Mr. F. W. Prince of England. The barrel of this is made to slip forward in the stock about 3 inches by means of a handle secured to its lower side and projecting through the back of the stock. The cartridge is then introduced and the barrel is drawn back to its

place, in which it is ingeniously secured with tight and strong joints. It may be loaded and fired with great rapidity, Mr. Prince having made 120 shots in 18 minutes. The rifling is with 5 grooves deeply cut, and turning  $\frac{1}{4}$  round the barrel in its length of 3 feet.—Many other rifles might be named, some of which are unquestionably excellent firearms, but not different essentially from those described. Double-barrelled rifles are used to some extent, but, constructed on the English plan of two barrels, side by side, they are not so accurate as the single-barrelled piece. The Americans avoid the defects of this arrangement by placing one barrel over the other and causing them to turn on a common axis, so that one lock answers for both barrels. For hunting purposes one barrel is sometimes rifled, and the other is a smooth bore for shot.—RIFLED ORDNANCE. Although the rifling of cannon, as appears from the historical account already given, is by no means a late invention, and experiments were made throughout the 18th century in Germany and England with satisfactory results as to their increased range and accuracy, cannon of this character were slowly adopted by the armies of Europe. While the principle was understood to be good, the trials were generally abandoned, chiefly on account of the difficulties of charging the muzzle-loading pieces. Such is the history of the attempts of the French in the early part of the present century to introduce in smooth bore cannon the use of cylindro-spherical balls with a band of lead around their middle portion, thus giving a greater diameter than that of the barrel, and consequently a close fit without windage. And so of the experiments of Lieut. Col. Reichenbach of Bavaria in 1816 with a small bronze rifled cannon, of 7 grooves and cylindro-conoidal shot. But when rifled small arms had been improved so that their range was equal to that of ordinary field artillery, and the men serving this could be picked off by riflemen at a safe distance beyond the reach of its balls, it became at last apparent that the same system must be applied to the field ordnance or this would soon be of little service. It was, however, with heavy guns adapted for fortresses that the first satisfactory results were obtained with rifled cannon. In 1846 Major Cavalli of the Sardinian artillery constructed a 2-grooved breech-loading 30-pounder, carrying, with a charge of 5 lbs. of powder, a 64 lb. cylindro-conoidal hollow shot of hard metal, which was furnished with rings to fit the grooves. In his experiments with this he discovered the lateral deflection of all rotating shot to the side toward which they rotate, and to correct this he invented the lateral or horizontal tangent scale. His experiments at Turin in 1854 were highly satisfactory, his 30-pounder with 8 lb. charges, at an elevation of 25°, throwing a 64 lb. shot a distance exceeding 3 miles, with a lateral deflection from the corrected line of aim of less than 16 feet. The largest

field howitzer of the French at less than half this range gave average lateral deflections of 155 feet. About the time of Cavalli's completion of his gun Baron Währendorff, proprietor of the iron works at Aker, Sweden, produced a wrought iron gun, also breech-loading, with shot of similar shape to those of Cavalli, but covered with a thin layer of lead. Trials were made of these pieces in 1850 at Shoebury Ness, England, against the English service 32-pounders of 56 cwt., and at high elevations the results were very favorable for the greater range of the rifled pieces. Next came the Lancaster 8-inch gun, which was tried at Shoebury Ness in 1851, and afterward thoroughly tested in the Crimean war, where, being the first rifled cannon used in service, much interest was attached to its operation. It had 2 deep grooves rounded at the edges and thus giving to the bore an oval form. The projectiles were wrought iron bombs, cylindro-conoidal, with an elliptical section adapted to the bore. The practice with them was not satisfactory, the friction being very great, and the shells bursting in the bore, and the pieces themselves also frequently bursting. The French also from the year 1842 were gaining experience in the qualities of rifled cannon, chiefly through the experiments of Capt. Tamisier at Vincennes, and in 1850 a very satisfactory trial was made with a 3-grooved 6-pounder and elongated shot which he had a few years before constructed for the duke of Montpensier, then colonel of artillery. His pieces were further tested at La Fère, a fortified place in the department of Aisne, by Cols. Treuille and Virlet, and the results were so satisfactory that the government prepared more than 200 rifled guns of the old 4-pounder size, 3.36 inches caliber, and also 12-pounders of 4½ inches, which were brought into service in the Italian war. These pieces were made, some of gun metal, and some of cast steel. They were muzzle-loading, made with 6 grooves, and the smaller size carried cylindro-conical shot, hollow, which weighed when filled 12 lbs. The piece itself weighing only 784 lbs. is easy of transportation, and is more efficient in range and accuracy than the guns of double the weight that were used in the Crimean war.—The achievements of the English in rifled cannon did not terminate with the Lancaster gun, but two other pieces of superior excellence have since been perfected, known respectively as the Armstrong and Whitworth guns, both inventions of civilians. Sir W. Armstrong of Newcastle-upon-Tyne commenced, in Dec. 1854, the construction of his first gun, which was completed the next spring. His object was to produce an arm adapted for field artillery, corresponding to the old 6-pounder, but with greatly reduced weight of metal and increased range and precision. The piece was about 14 inches diameter of bore, and 6 feet long beside the breech, which contained in the end a powerful screw and the apparatus for securing the joint—the

piece being breech-loading. It was made of an inner tube of cast steel overlaid with two tubes of wrought iron made in the manner of the twist barrels (see GUN), one succeeding the other. The bore was rifled with 8 grooves, making a complete turn in 12 feet. The chamber for the charge, 16 inches long, was not grooved, and was  $1\frac{1}{2}$  inches in diameter. The whole weight of the gun was about 550 lbs. The projectile was of cast iron coated with lead, cylindro-conoidal in form,  $6\frac{1}{2}$  inches long, of larger diameter than the bore, and 5 lbs. weight. It was hollow, so as to be used either as shot or shell. The charge was  $\frac{1}{2}$  the weight of the shot. A target 5 feet wide and  $7\frac{1}{2}$  feet high being set up 1,500 yards distant, and 6 shots being fired to get the correct elevation, the next 8 struck the target without grazing, and the mean deflection from the centre line was only  $11\frac{1}{2}$  inches. The elevation of the gun was  $4^{\circ} 26'$ . These results were very remarkable, as the 6-pounder field piece in ordinary use, which in point of weight formed the nearest approach to this gun, was very uncertain at 1,000 yards, and useless at 1,500; and for the heavier ordnance of so long range, the deflections were invariably recorded in yards rather than inches. The experiments with shells were equally remarkable. The success of this gun led to the construction of others of larger sizes, even up to 100-pounders. The 12-pounders weighing 6 cwt. are adopted for field batteries and horse artillery, and were recently used in China; but it is intended to make them of 8 cwt., and to use a charge of 1 lb. 8 oz. instead of 1 lb. 6 oz. Wrought iron is now the material employed without the steel lining. Long bars being heated are wound round a roller, and the coil is then brought to a welding heat and hammered together. Tubes are thus formed of 2 to 5 feet in length, which are brought together and welded to give the required length. The grooves are narrow and shallow, and the lands or raised spaces having the same width, their number increases with the caliber of the gun; the 12-pounder has 34 grooves, which make half a turn in the length of the piece. The shells and fuse made by Sir W. Armstrong are of complicated construction and wonderfully effective. The former are composed of a great number of segment-shaped pieces of cast iron held together by the lead coat which is run among them, and they may be used either as shot, time or concussion shell, shrapnel, or case. In a trial of 7 shells fired at 2 targets, each 9 feet square, at a distance of 1,500 yards, the targets were struck in 596 places. At 3,000 yards the results were similarly remarkable. This long flight was obtained by raising the gun to an elevation of  $9^{\circ}$ , an inclination rarely if ever given to smooth-bored cannon, as above  $4^{\circ}$  elevation, to which the official tables are limited, the deflection of the projectile becomes so great as to deprive the shot of almost all chance of useful effect. In recorded cases of smooth-bored guns fired at

equal elevations with the rifled, the difference in range, though always in favor of the latter, is not so great as is usually supposed. At the extraordinary elevation of  $35^{\circ}$  the Armstrong 32-pounder has ranged 9,180 yards, or nearly  $5\frac{1}{2}$  miles. The penetrating power of the Armstrong gun was exhibited in a wonderful manner in some recent experiments on the coast of England against a martello or round tower. The guns employed were a 40-pounder of 31 cwt., an 80-pounder of 63 cwt., and a 100-pounder of only 53 cwt. The distance was 1,032 yards, and the projectiles were partly solid shot and partly percussion shells. The wall against which the firing was directed was 7 feet 3 inches thick. Through this wall the 80-pounder shot passed into the tower, the others penetrating about 5 feet. With shells from the several guns a large breach was opened after 8 or 10 rounds, exposing the interior; and after a total of about 170 shot and shell, of which a small proportion only were from the 100-pounder, the exposed side of the tower was completely destroyed and the opposite side injured, though protected by a mound of fallen materials.—The Whitworth gun is formed on the same principle as his smaller arm already described. The bore is hexagonal instead of circular, and the angles of the hexagon are rounded off. The twist in the same length is nearly double that of the Armstrong rifling, and the projectiles, by reason of the high pitch of the grooves, may be of great length. Though made for breech-loading, the guns may also be loaded from the muzzle. They are thus described in the lectures on artillery for the royal military academy: "The breech is closed by a cap which screws on outside, and works in an iron hoop attached by a hinge to the side of the breech; the cap is opened back for loading, after which it is shut to like a door, and then screwed on to the breech by a handle for the purpose; the vent is in the centre of the cap, and therefore in line with the axis of the bore. For smaller sized guns Mr. Whitworth uses homogeneous iron;\* the larger guns are made of the same material, but strengthened with wrought iron hoops fixed on by hydraulic pressure. The Whitworth projectile is hexagonal, its form corresponding to that of the bore, and it is made of cast iron accurately turned by machinery; for penetrating hard substances, as wrought iron plates, the projectile is flat-headed and made of homogeneous iron. The charge is  $\frac{1}{2}$  the weight of the projectile, and is placed in the bore in a tin cartridge, which remains in until after the gun is fired, when it is removed; a wad of lubricating substance closes the front of the cartridge, and is intended to prevent the fouling of the bore." The dimensions of the 3 sizes of guns are given in the following table:

\* Homogeneous iron is wrought iron melted and cast in moulds like cast steel, and is more difficult than this to prepare. The homogeneity of texture thus produced secures the greatest strength.

Size.	Bore.		Length.	Weight.	Pitch of rifling, one turn in
	Major axis.	Minor axis.			
3-pounder	1.6	1.43	6 0	..	3 ft. 4 in.
12-pounder	3.1	2.8	7 9	8 0	5 " 0 "
80-pounder	5.3	5 0	9 10	80 0	8 " 4 "

The following ranges were obtained with the 12-pounder in trials made in February, 1860, at Southport on the Lancashire coast. At 2° elevation, with a charge of 1½ lbs., from 1,208 to 1,281 yards. The old 12-pounder, weighing 18 cwt., at this elevation gives 1,000 yards. At 5° from 2,298 to 2,342 yards, and at 10° it averaged 4,000 yards. The old 32-pounder at these elevations ranges from 1,940 to 2,800 yards. For higher elevations the 3-pounder was used with 8 oz. charges. At 20° the range was from 6,300 to 6,800 yards, and at 33° and 35° from 9,400 to 9,700 yards, the last exceeding 5½ miles. The old 56-pounder of smooth bore at 20° ranges at 4,381 yards, and at 32° at 5,680 yards. In precision as to lateral deflection the results, according to some authorities, were as satisfactory as those obtained with the Armstrong gun. The penetrative power of the flat-headed projectile against iron plates is greater than that of any other projectile.—The experiments of American inventors and artillerymen have been directed chiefly to modifications of the bullet. The Hon. Charles T. James, of Rhode Island, makes a cylindrical bullet with a conical head of cast iron, the cylindrical part at the ends being ⅓ of an inch less diameter than the bore of the gun, and having a depression around its central portion from which, like the mortises in the hub of a wheel, 8 rectangular openings connect with the central cavity in the rear end. The depressed portion of the cylinder, after being encircled with a cylinder of sheet tin covered with another of canvas (the diameter of the tin tube being equal to the greater diameter of the cast iron cylinder, and its length equal to the width of the depression), is filled in with melted lead, which adheres to the tin and forms a compact band around the central portion of the projectile. In the discharge the gases are forced into the central cavity and press this band outward, and the canvas is compressed into the grooves, preventing the escape of any portion of the gases past the bullet. The projectile of the Messrs. Hotchkiss of Sharon, Conn., is of cast iron covered in the middle with an enlarged zone or wide band of lead, also designed to procure a tight fit. To the rear end is attached a cast iron cap, wedge-shaped in front, which is driven on to the rear end of the shot and into the belt or jacket of lead. This combines two of the older devices for small rifled arms already described, and adapts them to the larger projectiles of hard metal, either shot or shell, required for cannon. The Sawyer projectile, made by Mr. Silvanus Sawyer of Fitchburg, Mass., is an elongated, hollow, non-expanding bullet covered with a coating of lead, and furnished with projections

adapted to the grooves of the barrel, which make one turn in 20 feet. A small 6-pounder tried in June, 1861, at the Rip Raps in Hampton roads, Va., easily threw a projectile to Sewall's Point, a distance of 3 miles.—A gun devised by Prof. A. K. Eaton of New York contains several new features that may prove important. For the purpose of securing the complete combustion of the powder in the gun, and of first giving to the projectile a movement from its seat before it receives the full impulse of the powder, by means of a steel tube or spill extended from the percussion tube through the centre of the charge, he communicates the fire to the front of the charge, which portion consists of a slow grade of powder, behind which is the quick powder designed to act after the bullet is started. With the same object he has introduced in rifled small arms a short tube attached to the centre of the breech and just as long as the depth of the charge. The powder being introduced so as to fill this tube and the annular space around it, the bullet is dropped in, covering the open end of the tube. The fire is communicated first to the powder in the tube, and its explosion gives a start to the bullet before the powder outside the tube is fairly ignited. By either of these methods the whole of the powder must be consumed and the projectile receive its total effect; but in the usual way of firing the charge behind, it is well known that a portion of the powder escapes combustion and is thrown out in front of the gun. When the ground is covered with snow or with a white cloth the unconsumed grains may be collected. Another improvement devised by Prof. Eaton is intended to correct the tendency of the bullet to deviate from a straight path by the friction of the air against one side of the edges of the projections which it receives from the grooves of the gun. The square-sided projections, striking the air, also cause some resistance to the rotation, which is the occasion of the whizzing sound peculiar to the elongated grooved bullets. To obviate these defects Prof. Eaton bevels off that edge of the grooves, so that the projections on the bullet are also bevelled on the side which impinges upon the air, and the onward movement of the bullet is consequently found to be more quiet and its course more direct.\* A third improvement is in the manner of securing the breech for breech-loading, which consists in the use of two wedge-like blocks of steel let into a long slot which passes into the breech from the top. One of the blocks closes the opening and is secured by the second; both are attached to a single lever, which by two movements made in an instant by the hand opens or closes the bore. When opened, the cartridge, contained in a steel cartridge case, is slipped into the breech end, and the block im-

\* This modification of the grooves was made in 1858, previous to the same thing being done by Gen. Balleau of the military corps of engineers in India, for the purpose of easing the passage of the bullet when introduced through the muzzle, and with a very different object in view.



mediately let down and secured. The case fits closely to the bore, and, expanding at the moment of explosion, forms a perfectly gas-tight joint. After the discharge it is taken out to be again used. In order to secure the coating of lead to the surface of the cast iron projectile in such manner that it cannot possibly strip off, Prof. Eaton invented a method of causing this to enter into chemical union with tin, and a film of this once being firmly attached to the iron, the lead is readily received and firmly held. By a few trials of a 6-pounder gun of 2 inches bore made in July, 1861, at 5° elevation, a range of 2,145 yards was obtained at the first graze, and an extreme range of 2,935 yards. At 10° the first graze was over 4,000 yards, the bullets striking in the water beyond the limits of the beach, which was at the above distance from the gun. At 2° elevation the bullets passed through a 6-foot target, with 1,100 yards average first graze and extremely slight lateral deviation. Many other improvements either in the bullet or the rifle are now constantly presented to the attention of the public, and it is not unlikely that some among them may prove of as much importance as any of those named.—For rifled ordnance the strongest materials are required, and wrought iron and bronze have generally been used in preference to cast iron. In the exigency of a sudden demand, smooth-bore cast guns are, however, largely rifled, and in the perfection in which these pieces are now made (see CANNON), they may be depended upon for good service for siege artillery. Steel has recently been brought into this use, and there is no question but that it is the best material; but the difficulties of forging large masses of steel, even if they can be obtained of a homogeneous character, are almost too great for the present conditions of this manufacture. If the temperature required for welding be a little exceeded, the mass may lose its form by a partial fusion. Little is known also of any practicable method of producing large masses of steel of uniform or of any particular quality. If the steel be cast from pots in the usual way, a multitude of these would be required to furnish enough for a single cannon, and a variety of grades would be brought together, producing a very uncertain mixture. The puddling process has been recommended, the same as adopted for making wrought iron, but stopping it at the point where the proper proportion of carbon for steel remains; but this would seem to be impossible to attain in practice. Steel cannon, however, are made, and very large masses of steel are produced by M. Krupp at Essen in Prussia; but whether cast or forged is not known, the process being a secret. Even as far back as 1845 steel cannon said to be cast were made at his establishment. Large guns of this material must come into use, but their great cost by any known method of manufacture will probably greatly retard their introduction. In New York a method of con-

structing steel cannon similar to that recommended by Prof. Treadwell for making wrought iron guns (see CANNON), by shrinking on and welding rings of metal over the central tube, has been introduced, and it is believed proves perfectly practicable, by Mr. Wiard, whose steel cannon thus made were advertised for sale in July, 1861.—Many works have recently been published on the subject of rifled arms, among which are the following: "Le Conteur on the Rifle" (London, 1855); "Naval Gunnery," by Sir Howard Douglas (London, 1859); "Handbook for Rifle Volunteers," by Capt. W. G. Hartley (1859); "The Rifle Musket," by Capt. Jervis White Jervis, royal artillery (London, 1859); "The Rifle, and how to use it," by Hans Bask (London, 1861); "Rifled Ordnance," by Leynall Thomas (1861); "Rifles and Rifled Ordnance: an Elementary Treatise on the Theory of Rifle Firing," by Capt. C. M. Wilcox, U. S. army; "Ordnance and Gunnery," for the use of the cadets of the U. S. military academy, by Capt. J. G. Benton; and Whitworth on rifled firearms.

RIGA, a fortified town of Russia, capital of the government of Livonia, situated upon the Dvina about 5 m. above its mouth in the gulf of Riga, 312 m. S. W. from St. Petersburg; lat. 56° 57' N., long. 24° 6' E.; pop. about 60,000. The harbor is large and safe, and vessels unload and load alongside of quays. Riga stands upon a sandy plain surrounded by hills, and the suburbs are more extensive than the town itself. Woollen and cotton goods, iron ware, canvas, &c., are manufactured. The trade of Riga is greater than that of any other Russian port except St. Petersburg. The town was founded by Albert, bishop of Livonia, and founder of the order of knights sword-bearers, in the year 1201, about 50 years after the introduction of Christianity into the country. It consisted at first of a colony of Germans, was the capital of the order, which subsequently became united with that of Teutonic knights, and in the 13th century joined the Hanseatic league. The reformation having spread in Livonia, Kettler, the last commander of the knights sword-bearers, resigned his dignity, and Riga was annexed to Poland in 1562. Gustavus Adolphus took it in 1621; and after great suffering from both bombardment and plague it surrendered to Peter the Great in 1710. In 1812 it was unsuccessfully besieged by the French and their allies the Prussians, when its suburbs were destroyed. A granite column commemorates the defence.

RIGAS, CONSTANTINOS. See RHEGAS.

RIGAUD, HYACINTHE, a French painter, born in Perpignan, July 25, 1659, died in Paris, Dec. 19, 1743. He learned the rudiments of art from his father, and when scarcely 22 years of age went to Paris, and devoted himself to portrait painting. He has been styled the "French Vandyke." Admitted to the academy of fine arts in 1700, he finally became its director. He left more than 200 portraits.

RIGDON, SIDNEY. See MORMONS, vol. xi. p. 735.

RILEY, JOHN, an English portrait painter, born in London in 1646, died there in 1691. He was unsurpassed until the appearance of Sir Joshua Reynolds. He painted the portrait of Charles II., who rather disconcerted the artist by exclaiming: "Is this like me? Then, odd's fish, I am an ugly fellow." He also painted James II. and his queen, William and Mary, Bishop Burnet, Dr. Busby of Westminster, and Lord Keeper North.

Rimini (anc. *Ariminum*), a walled town of Italy, on the Marecchia, situated in a fertile plain in the legation and 24 m. E. S. E. from the city of Forlì; pop. 17,500. There are several squares, and a wide street leads to a bridge over the river, begun by Augustus and finished by Tiberius, built of white stone found in the neighboring Apennines. Rimini contains several churches, and the cathedral of San Francesco, of the 15th century, highly ornamented with sculptures, statues, and bass-reliefs. There are many remains of antiquity, including a triumphal arch of Augustus. Silk, glass, earthenware, chemical acids, and saltpetre are manufactured. Rimini at one time formed a small independent republic.

RINÇON, ANTONIO DEL, a Spanish painter, born in Guadalajara in 1446, died in Seville in 1500. He studied his art in Florence, and upon returning to Spain was taken into the service of Ferdinand the Catholic, who made him court painter. Of the few remaining works by him a series in the church of Rabledo de Chavala, near the Escorial, representing scenes in the life of the Virgin, are the best. He is considered the father of the Spanish school.

RINGGOLD, a S. W. co. of Iowa, bordering on Missouri, and intersected by the Platte and by the E. and W. forks of Grand river; area, about 600 sq. m.; pop. in 1860, 2,923. It has an undulating surface and fertile soil. Capital, Cadwallader.

RINGGOLD, SAMUEL, an American officer, born in Washington co., Md., in 1800, died of a wound at Point Isabel, Texas, May 11, 1846. He was graduated at the West Point military academy in 1818, and immediately entered the army as 2d lieutenant. He served for several years as aide-de-camp to Gen. Scott, in 1822 was made 1st lieutenant, and in 1832 became captain by brevet. In 1836 he was made captain, served in the war against the Florida Indians, and was brevetted major for active and efficient conduct. He organized a corps of flying artillery, to which he paid especial attention. During the Mexican war he was mortally wounded at the battle of Palo Alto, and died shortly afterward.

RINGWORM. See EPIPHYTES, vol. vii. p. 247.

RINTOUL, ROBERT STEPHEN, a British journalist, founder and editor of the London "Spectator," born in Scotland in 1787, died April 22, 1853. He was educated in the grammar school of Edinburgh, and came into active life

at a time when the events of the French revolution, the spirit of reform in England, and the brilliant disquisitions in the "Edinburgh Review" had aroused great activity of thought both in church and state. About 1813 he became editor of the "Dundee Advertiser," and endeavored to elevate the compilation of a newspaper into an art, and to present a condensed and attractive record of contemporaneous history. On one occasion at least, in order to secure a sufficiently effective display of news and discussions, he rewrote the whole contents of a number. One of his intimate associates at this time was Thomas Chalmers, then a country pastor. He advocated in this journal educational improvements and liberal politics till 1825, when he accepted the editorship of the London "Atlas." Differences arising between the editor and proprietors, Rintoul determined to establish a new paper in which he should have absolute power. The first number of the "Spectator" appeared July 5, 1828, edited by Rintoul, supported by an efficient literary staff. It was the champion of reform in the struggle which preceded the passage of the reform bill, and directed attention to the specific reforms in the financial, war, and other departments, which ought to be immediately effected by a reformed parliament. Rintoul continued the agitation of reformatory measures, especially of systematic colonization and of the repeal of the corn laws, till a little before the accession of Peel, when he was convinced that reform was only a party cry; and upon the formation of the Peel cabinet the "Spectator" became one of its supporters.

RIO BRAVO DEL NORTE. See RIO GRANDE DEL NORTE.

RIO DE JANEIRO, a S. E. province of Brazil, bounded N. by Espiritu Santo and Minas Geraes, W. by São Paulo, and S. and E. by the Atlantic; area, according to the "Gotha Almanac" for 1861, 18,275 sq. m.; pop. in 1856, 1,200,000. The province is divided into 8 comarcas. The chief towns are Rio de Janeiro, Porto d'Estrella Mage, and Nitherohi, the capital of the province. The N. E. part of the coast is low and uninteresting, and is lined with lagoons and extensive tracts of marshy land; toward the S. this character disappears, and the scenery becomes exceedingly beautiful. There are several fine bays and harbors, the chief of which is that of Rio de Janeiro. This bay is some 70 m. in circuit, contains many islands, and communicates with the sea by a deep channel about 1 m. broad. There are several rivers, the most considerable of which is the Parahiba. About the centre of the province a series of mountain ranges enter from the W., the most conspicuous being the Organ mountains, some of the peaks of which are estimated at 6,000 or 7,000 feet above the sea. The soil of the province is generally clayey, and is not naturally rich, but the climate is so favorable to vegetation that it produces luxuriant forests and abundant crops.

Gold is found in small quantities; iron is abundant, but the ore is not worked; and there are extensive beds of porcelain clay. The principal crops raised are coffee, sugar, rice, millet, manioc, and cotton. Large herds of cattle are reared. The Rio Janeiro or Pedro II. railroad passes through this province, and unites on the frontiers with two branches leading to Minas Geraes and São Paulo. Rio de Janeiro sends 10 deputies to the general legislative assembly, and appoints 5 senators. The provincial assembly is composed of 36 members.

**RIO DE JANEIRO**, commonly called Rio, or **RIO JANEIRO**, the capital of the empire of Brazil, situated in the province of the same name, on the S. W. side of an extensive landlocked bay, near its entrance, in lat.  $22^{\circ} 54' S.$ , long.  $43^{\circ} 15' W.$ ; pop. in 1855, 296,186, about  $\frac{1}{2}$  of whom were native whites,  $\frac{1}{4}$  foreign whites,  $\frac{1}{4}$  slaves, and the remainder free colored. The ground upon which the old town stands extends a short distance into the bay. It is laid out in squares, the streets, which are narrow, crossing at right angles; they are paved and have flagged footways at the sides. The houses are generally built of granite, 2 stories high. The new town is better built, and contains many elegant squares. It lies to the W. of the other, on the opposite side of a small inlet, which is crossed by a handsome bridge. This part of Rio has almost wholly sprung up since the seat of government was removed to it from Bahia. Between the old and new towns is an extensive square, supposed to be the largest in the world, called Campo da Acclamação. It is surrounded with houses, and contains the senate house, the town hall, the museum, and other public buildings. Rio contains a large number of churches and monasteries, and many of them are very richly adorned. Water is brought into the town from the springs of Mount Carcovado, by an aqueduct which crosses a valley 90 feet deep and 280 yards wide upon 2 tiers of arches, one above the other. Rio has a large theatre and an opera house, a palace of fine arts, exchange, museum, &c., and several charitable institutions, some of which are richly endowed. There are two colleges, a school of medicine and surgery, a naval and military academy, an academy of belles-lettres, and numerous common schools, and a library containing 80,000 volumes. There is a government printing office, and books are printed, but not extensively. Creditable periodicals and newspapers are issued from the press. The botanical garden is well attended to, and is said to contain many valuable exotic plants.—The anchorage of Rio is perhaps not surpassed by any in the world, and its scenery is magnificent. There are no docks, however, and the place is not well supplied with good quays and landing places. The only manufactures worthy of notice are leather and glass, and these owe their success to foreign skill and enterprise. Rio has a very extensive trade, which is rapidly increasing. In 1856, 8,683,120 cwt. of coffee

was exported; and in the same year there were also exported 14,338 carats of diamonds and precious stones, \$268,400 worth of timber, \$295,200 worth of calfskin, and \$200,600 worth of spirits, beside large quantities of tapioca, ipecacuanha, sarsaparilla, horns, sugar, &c. The principal articles imported are flour, grain, butter, cotton, woollen and silk manufactures, liquors, furniture, watches, jewelry, coal and metals, paper, books, and pottery. In 1855 the value of the exports was \$44,276,400, and of the imports \$39,254,800. Of the imported goods the United States supplied \$4,396,200, and took Brazilian produce to the amount of \$16,810,600. Great Britain supplied \$12,024,000 worth of merchandise, and received \$10,276,800 worth in exchange. France stands next upon the list as carrying on a large trade with Rio, and then follow the Hanse towns, Portugal, Belgium, Chili, Spain, Sardinia, and most of the other nations of Europe. In 1856, 3,620 vessels entered the port, 2,250 of which were from foreign ports.—The entrance to the bay of Rio de Janeiro was discovered by a Portuguese navigator on Jan. 1, 1531, and he, supposing it to be the mouth of some great river like those previously discovered to the N. of it, named it after the day (river of January). The French formed the first settlement in the neighborhood in 1555, which consisted chiefly of Protestant refugees. The Portuguese afterward expelled the French, and founded the city of Rio, which they called St. Sebastian, in 1567. In 1763 the town had grown to such importance that the viceregal residence was transferred thither by the government of Portugal from Bahia, hitherto the capital of Brazil. In 1808 the Portuguese court arrived at Rio; and in 1822 it became the capital of the independent empire of Brazil.

**RIO DE LA PLATA.** See **PLATA**, **RIO DE LA**.

**RIO GRANDE**, a river of Senegambia, West Africa, rising in the Fouta Jallon mountains, and flowing W. to the Atlantic, in lat.  $11^{\circ} 20' N.$ , long.  $11^{\circ} W.$  It enters the sea by a number of branches, the principal of which is the Jeba (a name sometimes applied to the whole river), which is nearly 15 m. wide at its mouth and is navigable for some distance. The tide extends to Jeba, a village on the right bank of the river 80 m. from the sea. Dense forests skirt the banks of the river, and hundreds of ant hills are scattered along the shores. The country is populous, and produces in abundance ivory, gold, horses, and hides. The region about the head waters of this river has been but little explored.

**RIO GRANDE DEL NORTE**, or **RIO BRAVO DEL NORTE**, commonly called **RIO GRANDE** a river of North America, which has its sources in the Rocky mountains in about lat.  $38^{\circ} N.$  and long.  $106^{\circ} 30' W.$ , and flows into the gulf of Mexico near lat.  $25^{\circ} N.$  and long.  $97^{\circ} W.$ , after a course of about 1,800 m., for the greater part of which it forms the boundary line between Texas and Mexico. The general direc-

tion of the stream is at first S. E., then E., and afterward S. S. E., and finally E. The navigation of the upper part of its course is obstructed by rocky ledges and cataracts, and of the lower part by sand banks and numerous wooded islands; but small steamers have ascended to Kingsbury's rapids, about 450 m. from the sea. Like several other rivers in the southern part of the United States, the Rio Grande is subject to periodical floods, which commence in April, are at their greatest height in the beginning of May, and fall about the latter end of June. The Rio Pecos is the most important tributary, but at certain seasons its bed becomes dry; and for the greater part of the year the Rio Grande is fordable almost everywhere above the influence of the tide.

RIO GRANDE DO NORTE, a N. E. province of Brazil, bounded N. and E. by the Atlantic ocean, S. by the province of Parahiba, and W. by Ceara; area variously stated from 17,403 to 28,800 sq. m.; pop. in 1856, 190,000. It is divided into the comarcas of Natal and Assu; capital, Natal. There are many dangerous shoals along the coast, and though there are many small harbors, there is not one capable of receiving vessels of large size. In the S. and S. W. part of the province the surface is mountainous, but in the opposite directions it descends into plains which become sandy toward the coasts. The rivers all rise in the mountainous parts of the province or of Parahiba, and have short courses. The province is named from the Potengi, falling into the Atlantic at Natal, which was improperly called the Rio Grande by the first explorers. There are several salt lakes which yield large quantities of salt. Limestone, sandstone, and granite are abundant; and gold, silver, and iron are procured in small quantities. The soil is generally fertile upon the banks of the rivers, but in other places it is mostly sterile. Cotton is the most important crop, but sugar cane, rice, maize, and manioc are also raised. There are extensive tracts of pastures, and large herds of horses and horned cattle are reared. The forests, though not of very great extent, contain dye wood, and various kinds of balsams, resins, and gums. The exports consist principally of cotton, hides, sugar, salt fish, drugs, and dye woods. The province has a provincial assembly composed of 20 members, and sends 2 deputies to the legislative assembly of Brazil.

RIO GRANDE DO SUL, or São Pedro do Rio Grande, a province forming the S. extremity of Brazil, bounded N. by the provinces of Parana and Santa Catarina, E. by the Atlantic, S. by the republic of Uruguay, and W. by that of Paraguay; area, 98,000 sq. m.; pop. in 1856, 201,300. It is divided into the military districts of Porto Alegre, Rio Grande, Rio Pardo, and Sete Missoes; and Porto Alegre is the capital. The sea coast is generally flat and sandy, and several reefs lie off it which render navigation dangerous. A chain of mountains traverses the province, between which and the

sea lie several large lakes which are connected together and have a length of about 240 m., with a breadth varying from 4 to 30 m. In the S. the rivers flow into these lakes, but in the N. they flow W. either to the Parana or Uruguay, the latter of which forms the W. and part of the N. boundary. Gold and silver are found, and rich iron ore, sulphur, and porcelain clay are abundant. The climate is mild and healthy. The soil is generally fertile, though there are considerable arid tracts. Various kinds of grain are produced, and all the fruits of temperate regions grow in abundance. Cattle are reared in great numbers. A German colony was established at St. Leopoldo, about 40 m. N. from Porto Alegre, in 1845. The provincial assembly consists of 28 members, and the province returns 3 members to the general legislative assembly.

RIO NEGRO, or GUAINIA, a river of South America, one of the largest affluents of the Amazon, rising in a swampy district of New Granada, about lat. 2° 30' N., long. 73° W., and falling into the Amazon in the province of Para, Brazil, after a course of about 1,000 m., in lat. 3° 16' S., long. 59° W. It runs first nearly E. and then S. E., turning still more to the S. toward the latter part of its course. In lat. 2° N. the Rio Negro is joined by the natural canal of Cassiquiare, which unites it with the Orinoco; beside the Cassiquiare, which has a rapid current, the chief tributaries which join it from the N. or left bank are the Cababuri, Padaviri, Branco, Janapary, and the Anavelhana; and from the opposite side, or S. and W., the Aquio, Tomo, Xie, Icanna, Ubaupes (which is its largest affluent), and several smaller but considerable streams. In the lower part of its course the current is not rapid, as the river extends in places to 20 m. in breadth; where it joins the Amazon it is about 1½ m. broad. The water begins to rise in April, and is at its highest level in August; in the following month it begins to fall, and by March it is at its lowest; the difference between the levels is about 80 feet.

RIO NEGRO, or SAUCES, a river of South America, having its sources in two streams on the E. declivity of the Chilian Andes, which unite about lat. 40° 8' S. and long. 70° 53' W., and flow into the Atlantic ocean in lat. 41° 8' S., long. 62° 50' W., after a course of nearly 700 m. Its general direction is at first E. N. E. and afterward S. E. across the continent, between the Argentine confederation and Patagonia; and a great part of the country through which it flows is barren and sandy. The bed is much obstructed by shoals and islands, and the river is only navigable for small vessels for about 20 m. from its mouth.

RIO NÚÑEZ. See NÚÑEZ.

RIOT (Norman law Lat. *riota*, *riotum*; Fr. *riotte*, a brawl), in law, a tumultuous disturbance of the peace by three persons or more, who have assembled together of their own authority, for the purpose of assisting one another

in the execution of some private enterprise, and in resisting any one who shall interfere with or oppose their proceedings; and afterward actually carrying out that purpose in a violent and turbulent manner to the terror of the people. It is wholly immaterial whether the act intended is lawful or unlawful; for it is not the act itself, but the manner in which it is done, which creates this particular offence. Two persons alone may be guilty of a conspiracy, but it requires three to make a riot; and where three persons were indicted for a riot, and the jury found only one of them guilty, it was held that this verdict was void because one alone could not make a riot. Women may be punished as rioters, but infants under 14 years of age cannot. The object of the assembly must be of a private nature, as in a private quarrel or wrong; for the proceedings of a riotous assembly to redress public grievances or resist the officers of the king or state, may amount to overt acts of high treason, by levying war against the sovereign. In the latter case, the indictment generally charges that the defendants were armed and arrayed in a warlike manner, and, where the case admits it, with swords, drums, colors, and the like. But the question of riot or treason does not turn singly on any of these circumstances; the true criterion is: With what intent did the parties assemble—whether for a private and particular, or a public and general purpose? Numbers may supply the want of military arms and discipline, as experience has often shown, and such was the opinion of 5 of the judges in the weavers' case in 1675. In this case the weavers in and about London riotously assembled to destroy certain looms and machinery which had enabled those of their trade who used them to undersell the rest; and the defendants were indicted for treason, but were finally only proceeded against for a riot; the remainder of the court holding that, under the circumstances, their proceedings did not amount to a levying of war, as the motive was a mere private quarrel between different parties of the same trade, and related to no public or general object. On the trial of Lord George Gordon, the leader and instigator of the celebrated "no popery riots" in London in 1781, it was the unanimous opinion of the king's bench that an attempt by intimidation and violence to force the repeal of a law was a levying of war against the king. So, too, in the case of Demaree and Purchase, indicted severally in 1719, "for that they with a great multitude of people, to the number of 500, armed and arrayed in warlike manner, &c., did traitorously levy war, &c.," it appeared that the rabble, with cries of "Down with the Presbyterians," "Down with the meeting houses," &c., undertook by force and violence to carry their threats into execution, and actually did destroy a great deal of property, and resisted the officers sent to disperse them; and the judges agreed that this was a declaration against the "act of toleration," and

an attempt to render it ineffectual by numbers and open force, and amounted to high treason. In every riot there must be such circumstances of actual force and violence, or an apparent tendency thereto, as will naturally strike terror into the people; but it is not necessary that actual force or violence should have been committed. Therefore assemblies at wakes, or on festive occasions, or for the exercise of common sports and recreations, or any number of persons assembled peaceably to do a lawful thing, are not riotous. So also three or more persons may assemble together to commit an unlawful act without creating a riot, as to carry away a piece of timber or other thing which it requires a number of persons to accomplish; and if there are no threatening words used, and no breach of the peace is committed, it is merely a trespass. The violence and tumult must also be premeditated, for if they arise accidentally from some cause not likely to produce them, it is but an affray. Thus, if several are assembled together for a lawful purpose and a quarrel happens among themselves, it is not a riot, but only a sudden affray, and none in the assembly are guilty but those who actually participate; as in an unpremeditated fight at a fair or market, or other innocent occasion; and as a further illustration, given in the old books, "if 12 jurors (being committed to the keeper) do fall out and fight, 6 against 6, this makes not a riot, because they were lawfully assembled, and were compelled to be in company together." So, too, if the audience at a theatre or other public performance express their feelings by applause or hisses in the excitement of the moment, it is merely a disturbance or misdemeanor. But even though the parties assemble in the first instance for a lawful purpose and with peaceable intent, yet they may afterward be guilty of a riot; as for instance, if a dispute arise among them, and they form themselves into parties or factions, with promises of mutual assistance, and then make an affray, it is a riot; for the fact of forming such factions or parties and then acting with a definite and unlawful intention is constructive evidence of premeditation. If three or more persons, lawfully assembled, quarrel among themselves, and the party falls upon one or more of their own number, this is a simple affray; but if they attack a stranger, the very moment the quarrel begins it becomes an unlawful assemblage, and it is a riot in all those who join the affray, but only in them. So a person seeing a riot and joining therein becomes a rioter himself, though he did not go there premeditating the act, and is liable as a principal with the rest. The inciting persons to assemble in a riotous manner is also an indictable offence. The law will not allow individuals to seek redress for private grievances by disturbing the public peace, though in some cases the justice of the quarrel in which they are engaged may be a great mitigation of the offence.—By the common law, riots were punished by fine and imprisonment, and if enor-

mous by the pillory. But these penalties being found insufficient, statutory provisions were early made for their suppression. The first English statute enacted for this purpose was 34 Edward III. c. 1, E. II., which gave justices of the peace very extensive authority in such cases, and visited the offence with severe punishment. The statute 1 George I., commonly called the "riot act," made it a capital felony for persons riotously assembled to the number of 12 or more to continue so assembled for one hour after proclamation by a justice of the peace requiring them to disperse; thus leaving the offence, if committed by more than 3 and fewer than 12 persons, punishable by fine and imprisonment only, but if by 12 or more by death. Subsequent statutes made other specific offences felonious, such as riotously demolishing any church or chapel, or any house or other building, or any machinery or manufactory, or forcibly obstructing the export of corn from any part of the kingdom. Principals in the second degree and accessories before the fact were also punishable as felons. In the United States the statutory provisions respecting riots follow in a great measure those of England, but are milder in their punishments and more qualified in their application.

RIPARIAN (Lat. *ripa*, the bank of a river), in law, a term relating to the rights and privileges of persons who own lands lying upon or bounded by streams or rivers. At the common law all bays and arms of the sea, and all rivers wherein the tide ebbcd and flowed, were considered navigable, or public highways; and all rivers, irrespective of size, where the tide did not ebb and flow, were unnavigable. The owner of land lying upon an unnavigable stream (in the common law sense) owns the bed of such stream to its centre, or thread; and the grant of a piece of land bounded by a river will carry the exclusive right and title of the grantee to the middle of the river, unless the grant certainly expresses the intention of the grantor to convey only to the bank or margin. If a person owns the land lying on both sides of the river, he also owns the whole river as far as his land extends along it; and the owner in fee of land lying under an unnavigable river, whether he owns the whole bed or only to the centre on one side, may sell and convey such land separate from the upland to which it is attached. Where a river is actually navigable for boats and rafts, the public have an easement in the water for this purpose, and are entitled to a right of passage up and down, which the riparian proprietors cannot interfere with or prevent; and all obstructions or impediments to the free use of the river in this manner are public nuisances, which the public may lawfully abate. The owners hold the land under the water subject to the public right of passage over it. The proprietors of adjoining banks are entitled to use the water of the river, and the land under it, as regards the public, in any manner or for any purpose what-

ever, not inconsistent with this easement; and neither the state nor any private individual has a right to alter the course or character of the stream, or to render it by any means less useful to the owner of the soil.—When a piece of land in a conveyance lies upon and is bounded by a navigable pond of water, the grant only extends to the margin of the pond, and the grantee acquires no right to the soil beneath it. So riparian owners on technically navigable rivers, that is, on rivers in which the tide flows, are not entitled, as a matter of right, to the soil under the water in front of their uplands, because it belongs to the state. The land covered by navigable ponds and lakes also belongs to the state, and it would require a specific grant to authorize the riparian owner to go beyond the shore; but a grant of the bed of such a pond or lake could only be made to the owner of the adjoining shore.—If the water running between the lands of separate owners gains gradually and imperceptibly upon one side or the other, the title of each continues as before to the middle of the stream regardless of the change. But if the change takes place suddenly and visibly, the ownership remains unchanged, and the boundary line continues as previous to the alteration, at what then was the middle of the stream. If therefore the river should suddenly and entirely forsake its natural channel, and make for itself a new one in the lands of the proprietor on one side, he would thereby become the exclusive owner of the soil under the whole river so far as it was enclosed in his land. If soil be formed by alluvium or the washing up of earth out of the river, by slow and imperceptible accretion, or by the dereliction of waters which have gradually receded and left the land beneath them bare and dry, it belongs to the owner of the adjoining land. Islands formed in the same manner are subject to the same rule. If they are formed near the shore, they belong to the person who owns the land on that side of the stream to which they are nearest; if they are formed in the middle of the stream on both sides of the dividing line or centre, they belong to the proprietors on both sides in proportion to the extent which may lie on their respective sides of the line. Lands and islands formed out of the sea, or in navigable, *i. e.*, tide rivers, belong to the sovereign or state, and not to the proprietors of the adjoining shore. By the common law the sea shore, being that part between high and low water mark where the tide ebbs and flows, belonged to the sovereign or state, and was common to all the public, the possession of the adjoining proprietors extending only to high water mark; but in this respect the common law has been changed in Massachusetts and Maine, as to owners on bays and arms of the sea, by the colony ordinance of 1641 and the usage arising therefrom, and the proprietorship goes to low water mark, subject to the public easement, and not exceeding 100 rods below high water mark. And now, in most of the states which lie

on tide waters, the owner of land has some right to use it as far as low water, for the purpose of putting a wharf or similar building there. In Connecticut this has been asserted by the courts in the fullest extent.—The common law definition of a navigable river, being one where the tide ebbs and flows, has been considered and judicially adjudged to be inapplicable to the great rivers of Pennsylvania, Alabama, and other states. These rivers are declared to be navigable, and the boundaries of adjacent lands extend not to the middle of the stream, but only to low water mark. By various acts of congress all navigable rivers in the western states and territories are declared to be public highways; and the general understanding in this country seems to be that where a river is deep enough to permit the navigation of a sea vessel to and from the ocean, it is a navigable river, and the rights and privileges of riparian owners are regulated accordingly. But this question, where not particularly regulated in the several states by statute or judicial decisions, is still somewhat unsettled; and even where navigable waters are declared to be common highways, and as such for ever free to the public, it does not appear that the common law principle, that he who owns the land on both sides owns the entire river, and he who owns the land on one side only owns to the middle of the river, in both cases subject only to the easement of navigation, is thereby abolished.—While every riparian proprietor has an equal right to the free use of the water which passes his land, as it is accustomed to flow, without any diminution or alteration as to quantity or quality, he has no exclusive property in the water itself, but a simple usufruct while it passes along; and he cannot appropriate it to his exclusive use, or divert it from its natural channel, without the consent of the adjoining proprietors, who have an equal right to its use with himself. If he does divert it on his own premises, he must return it to its ordinary course when it leaves his estate. He may use it to irrigate his lands, or to water his cattle, or he may use the whole force of it in any reasonable manner he chooses, so long as such use does not interfere with the rights of his neighbors. But he cannot use it to the prejudice of any adjoining proprietor, unless he has a prior right to divert it, or a right by grant or by prescription (which supposes a grant) to some exclusive enjoyment of it. Whether, without such right, his use be reasonable or not, depends upon the circumstances of each case. The natural title which riparian owners thus have to the reasonable use of the waters may be restricted, altered, or enlarged by such grants or prescriptions; otherwise streams of running water could never be effectually applied either to agricultural or manufacturing purposes. Twenty years' exclusive occupation and use of water in any particular manner raises the presumption of a grant for that purpose from the adjoining proprietors; and owners whose

land lies above or below must take the stream subject to such adverse right. But nothing short of an express grant, or the use and enjoyment of the water so diverted or obstructed, or materially changed in its course and character, for a sufficient length of time to raise the legal prescription of a grant, will justify the owner as against any other owner to whom such alterations may prove injurious.—By the common law the proprietor of land lying upon an unnavigable river possesses the exclusive right to fish therein, as far as the middle of the stream; and if he owns both sides he has exclusive right, for fishing purposes, to the whole river, as far as his land extends, subject only to the rights of the public in the same as a highway for navigation. But this right is qualified by the same general rule which regulates his other riparian rights; it must be so used as not to injure or interfere with the rights and privileges of others. Therefore he cannot erect dams, weirs, or other obstructions for the purpose of preventing the ascent or passage of fish. Such impediments were regarded by the common law as a nuisance, and in Massachusetts the party offending in this manner is subject to a penalty provided by statute. The common law right of fishing may be controlled or modified by the municipal law of the land, and in many of the states it is regulated by statute provisions. On navigable rivers and tide waters, however, the adjoining proprietors do not possess this exclusive right of fishing opposite to their own lands, but it is a public and common privilege in which every one is equally entitled to share. But this public right of fishing in the water does not extend to permitting a stranger to pass over the land of another in order to reach the water. Neither are persons claiming and enjoying this common right entitled to draw the seine, or to fish, or build fishing huts, or dry their nets, upon the land of the adjoining owner, or upon islands which are private property; but this privilege belongs exclusively to the owner of the soil. The civil law declared that the right of fishing was common in rivers, as well as in the sea, and gave the use of the adjoining banks for this purpose to the public. This principle is acknowledged where the civil law prevails, and has been adopted by some of the states in regard to their large navigable rivers, but it is unknown to the common law.—A question which has been much discussed and variously regulated by different nations is that relating to the public right to a foot or tow path along the banks of navigable rivers, and the use of the banks for the assistance or convenience of navigation. The civil law allowed such a right, and held that all persons had the same right to bring their vessels to land and fasten ropes to the banks of the river that they had to navigate the river itself. The same doctrine is held in Louisiana and some other states, where it has been decided that, though the banks of navigable rivers are the property of



those who own the adjoining lands, yet they are so far subject to the public use, that vessels may make fast to the shore and to the trees upon it, and may unload and deposit their goods there. In New York it has been adjudged that the public have no such right as against the will of the owner. The common law, according to Bracton, was anciently the same as the civil law, but the point remained unsettled until 1789, when it was decided that there was not any right at common law for the public to tow on the banks of navigable rivers. In Illinois and Tennessee it has been decided that though the Mississippi was not a navigable stream at common law, and the title of the riparian proprietor therefore extended to the middle of the stream, yet the rights of navigation upon it were not confined merely to floating on the water, but included the right to land and fasten to the shore as the exigencies of navigation required. But riparian proprietors cannot be cut off from the water by any extraneous additions to their upland, such as wharfs or quays, without their consent.—Another unsettled question in the United States is that respecting the right of ferriage which attaches to riparian ownership. This matter is generally regulated by statute, and the state, by virtue of the law of eminent domain, claims the right to establish ferries wherever the legislature may consider them necessary for the public accommodation, regardless of the ownership of the soil, except as giving a claim for just compensation. But the statutes usually authorize the grant of the franchise by way of preference to the owners of the land on each side of the river where the ferry is established. It has been held that the riparian owner has not, as a matter of right, the privilege of keeping a ferry, and that it can only arise from a grant, actual or implied. This was probably the rule of the common law. But, in the United States, we should say that it is the prevailing rule that the right to a ferry attaches to the riparian proprietor; that it cannot be taken from him without compensation; that he may convey the soil excepting the right of ferriage, which then becomes an incorporeal hereditament, and may be granted in the same way as a rent; and the grantee will have a right to use the adjoining soil, so far as may be necessary for ferry ways, but not otherwise.

**RIPLEY.** I. A S. E. co. of Ind., drained by Laughery and Graham creeks; area, about 450 sq. m.; pop. in 1860, 19,119. It has a generally level surface, and the soil is fertile. The productions in 1850 were 464,904 bushels of Indian corn, 39,587 of wheat, 89,826 of oats, 10,306 tons of hay, and 34,322 lbs. of wool. There were 22 saw mills, 8 tanneries, 1 newspaper office, 37 churches, and 3,572 pupils attending public schools. It is intersected by the Ohio and Mississippi railroad. Capital, Versailles. II. A S. E. co. of Mo., bordering on Ark., intersected by Current river, and drained by Little Black river, and Fourche, Dumas, and Davis's

creeks; area, 1,000 sq. m.; pop. in 1860, 3,747, of whom 78 were slaves. It has a rough and hilly surface, and a soil fertile near the streams. The productions in 1850 were 115,241 bushels of Indian corn, 8,603 of oats, 2,808 of wheat, 3,000 lbs. of wool, and 24,225 of butter. Capital, Van Buren.

**RIPLEY, ELEAZAR WHEELOCK**, an American general, born in Hanover, N. H., in 1782, died in West Feliciana, La., March 2, 1839. He was graduated at Dartmouth college in 1800, where his father was professor of divinity. Having studied law, he engaged in the practice of the profession in Maine (then a part of Massachusetts), and was speaker of the legislature in 1811. Upon the breaking out of the war of 1812 he was appointed lieutenant-colonel of the 21st regiment of infantry. In March, 1813, he was appointed a colonel, and in April, 1814, a brigadier-general; and he bore a distinguished part in the battles of Chippewa and Lundy's Lane, and in the sortie from Fort Erie, Nov. 3, 1814. For his conduct in these actions, in the two last of which he was severely wounded, he was breveted a major-general, and presented by congress with a gold medal. At the reduction of the army in 1815 he was retained in the service, but in 1820 he resigned his commission and settled in Louisiana. Between 1835 and 1839 he was a member of congress.

**RIPLEY, HENRY JONES, D.D.**, an American clergyman, born in Boston, Mass., Jan. 28, 1798. He was graduated at Harvard college in 1816, studied theology at Andover, was ordained in Boston in 1819, and for the next 7 years (except one year spent in Eastport, Me.) served as pastor of the North Newport Baptist church, in Liberty co., Ga. In Sept. 1826, he was appointed professor of biblical literature and pastoral duties in the Newton theological institution, Mass.; and some years later, when the duties of the professorship were divided, he became professor of biblical literature and interpretation; later still he relinquished this for the professorship of sacred rhetoric and pastoral duties. He continued his connection with the institution as professor for 34 years, resigning at the close of the academic year in 1860. He still resides at Newton Centre. In 1844 the university of Alabama conferred on him the degree of D.D., and Harvard university the following year. Beside several published sermons, tracts, and numerous articles in reviews, magazines, &c., he has published "Memoir of Rev. Thomas S. Winn" (Boston, 1824); "Christian Baptism" (1833); "Notes on the Four Gospels" (2 vols., 1837-8); "Notes on the Acts of the Apostles" (1844); "Sacred Rhetoric, or Composition and Delivery of Sermons" (1849); and "Notes on the Epistle to the Romans" (1857).

**RIPON, FREDERIC JOHN ROBINSON**, first earl of, an English statesman, born in London, Nov. 1, 1782, died at Putney heath, Jan. 28, 1859. He was the second son of Lord Grant-ham, a distinguished statesman and diplomatist,

and received his education at Harrow, and at St. John's college, Cambridge. In 1804 he entered public life as private secretary to the lord lieutenant of Ireland, and in 1807 was returned to parliament by the family borough of Ripon. His first appointment under government was that of under secretary of state for the colonies in 1809, from which period until the death of Mr. Canning in Aug. 1827, he was constantly in the discharge of important official duties. In the latter year, having previously been raised to the peerage as Viscount Goderich, he formed an administration; but in Jan. 1828, he resigned with his colleagues. He accepted office again under Earl Grey, and assisted his colleagues in carrying the reform bill, having previously voted in favor of Roman Catholic emancipation. In 1833 he was created earl of Ripon, and in the succeeding year retired from the cabinet in consequence of a difference of opinion with the premier regarding the Irish church bill. Between 1841 and 1846 he again held office under Sir Robert Peel, after which he took little part in public affairs.

RIPPERDA, JOHN WILLIAM, baron, afterward duke of, a Dutch political adventurer, born in the province of Groningen in the latter part of the 17th century, died in Tetuan in 1737. The scion of a Spanish family who had settled in the Netherlands, he received his education in the Jesuits' college at Cologne. He entered the Dutch army, served during the war of the Spanish succession, and reached the rank of colonel. In order to secure to himself the property of a wealthy heiress he had married, he turned Protestant, became a member of the states-general, and in 1715 was appointed envoy extraordinary to the court of Spain. Here he launched into schemes for the profit of the Spanish monarchy, and gained the favor of both Philip V. and Alberoni; he resigned in 1718 his office under the Dutch government, renounced his nationality, returned to Catholicism, was made superintendent of manufactures with a large salary, and by political intrigues contributed to the fall of Alberoni. He was sent as ambassador to Vienna, and succeeded in 1725 by a treaty in reconciling the two courts, which had been at war since the accession of Philip V. to the crown of Spain. He was made a duke and grandee of Spain, and on his return was appointed successively minister of foreign affairs, of war, and of finance. But he found himself unable to accomplish the too vast designs he had planned; the nobility despised him as a foreigner and an upstart; he fell into disgrace, and was arrested, May 25, 1737, and incarcerated in the fortress of Segovia. In a few months he escaped and took refuge in England, and in 1731 returned to the Netherlands; but he soon went to Morocco, was welcomed by Muley Abdallah, embraced the Mohammedan religion, assuming the name of Othman Pasha, and was placed in command of the army. In 1734 he marched against the

Spanish troops that had invaded the empire, met them near Ceuta, and was defeated. He passed his latter years obscurely at Tetuan. An anonymous account of his eventful career, *La vie du duc de Ripperda*, was published in French at Amsterdam (8vo., 1739), and translated and printed in London as "Memoirs of the Basha Duke of Ripperda."

RIQUET. See CHIMAY.

RISTORI, ADELAIDE, an Italian actress, born in Cividale, Friuli, in 1821. Her parents were provincial actors, and she is said to have appeared on the stage when only 2 months old. At 4 years of age she played children's parts, at 12 those of soubrettes and sentimental heroines; and in 1841 she took the chief parts in the comedies of Goldoni and other standard plays. She next essayed tragedy, but her predilection was for comedy, and in comedy her earliest triumphs were achieved. In 1847 she was married to the marquis Capranica del Grillo, and retired for a period from the stage; but having reappeared on one occasion for the benefit of a manager who had been unfortunate, her fondness for her former profession returned with a force which no considerations of rank or family could dispel, and thenceforth she has steadily adhered to the stage. She again studied tragedy, and in 1849 made her debut in Rome in Alfieri's *Myrrha*. The siege of the city by the French interrupting her performances, she assumed the part of a sister of charity, and ministered to the wants of the sick and wounded at the hospitals. In 1850 she reappeared in *Myrrha*, and subsequently performed with great success in *Rosamunda*, *Ottavia*, *Antigone*, *Maria Stuarda*, and other dramas by Alfieri, as also in *Francesco da Rimini* and *Pia dei Tolomei*. In 1855 she was received with great enthusiasm in Paris, and was soon pronounced the equal of Rachel. Lamartine addressed her in verse, and tempting offers were made by the government to induce her to accept an engagement at the *théâtre Français*, which she declined. Since then she has every season performed at the *théâtre Italien* in Paris, and in 1858 attempted in an Italian version the part of Phèdre, in which Rachel had achieved her greatest triumphs. In the spring of 1861 she also performed in Paris in French. She has appeared with signal success in Spain, England, and other countries, and may be said to occupy without a rival the place so long claimed for Rachel. Her chief quality is her action, and she is distinguished by a sympathetic sensibility, called by the Italians *affetto*. Her comic acting is also remarkable.

RITCHIE, a N. W. co. of Va., intersected by Hughes river, a branch of the Little Kanawha; area, about 450 sq. m.; pop. in 1860, 6,847; there were no slaves. It has a hilly surface, covered with forests, and the soil is fertile near the streams. The productions in 1850 were 101,884 bushels of Indian corn, 24,336 of oats, 5,989 of wheat, 2,503 tons of hay, 15,207 lbs. of wool, 4,295 of tobacco, and 41,978 of butter.

There were 2 saw mills, 5 churches, and 376 pupils attending public schools. Value of real estate in 1856, \$1,644,276, showing an increase of 52 per cent. since 1850. It is traversed by the north-western Virginia railroad. Capital, Harrisville.

RITCHIE, ANNA CORA MOWATT. See MOWATT.

RITCHIE, LERTON, a British author and journalist, born in Greenock about 1800. He was for some time in a banking house in his native town, but while yet a youth went to London, where he became an author by profession, writing for various periodicals, and at length publishing volumes of tales entitled "Head Pieces and Tail Pieces," "Tales and Confessions," a novel called "The Game of Life," and finally the "Romance of French History," which gave him considerable reputation. In conjunction with William Kennedy, he commenced and continued for some time the publication of "The Englishman's Magazine." Charles Heath, the engraver and publisher, next engaged him to write the letterpress for "Turner's Annual Tour" and "Heath's Picturesque Annual," to collect materials for which he made annual journeys over the continent of Europe. He edited 12 volumes of these works, and published in the mean time novels entitled "The Magician" and "Schinderhannes, the Robber of the Rhine," and edited the "Library of Romance." Subsequently he became editor of "The Era," a London weekly newspaper, and afterward of the "Indian News." He sold the latter journal and removed from London to Edinburgh, where he edited "Chambers's Journal" till 1858, when he returned to London. His latest publications are a novel entitled "Wearyfoot Common" (1857), and "Winter Evening Sketches and Essays" (1858).

RITCHIE, THOMAS, an American journalist, born in Tappahannock, Va., Nov. 5, 1778, died in Richmond, July 12, 1854. His father, a native of Scotland and a merchant, died when the son was 6 years old, and the latter on reaching the age of manhood supported himself by teaching a school at Fredericksburg. In 1803 he removed to Richmond, and in the following year became editor of a democratic journal previously known as the Richmond "Examiner," whose name he changed to "Enquirer." He continued its editor and proprietor for 40 years, during which period he wielded an influence upon the politics of Virginia and the Union unsurpassed by that of any other journalist. In 1845 he relinquished the "Enquirer" to his sons, and at the request of President Polk removed to Washington and took charge of the "Union," a journal established as the organ of the administration. He continued at this post for 4 years, when he returned to Richmond, and spent his latter years in retirement.

RITSON, JOSEPH, an English critic and antiquary, born in Stockton-upon-Tees, Oct. 2, 1752, died Sept. 23, 1803. He was a lawyer and conveyancer, but devoted himself chiefly to literary pursuits. When about 19 years of

age he began the practice of confining himself to a milk and vegetable diet, from "a most refined sense of humanity," says his biographer, Sir Harris Nicolas. He published several works of no great importance, except as disclosing Jacobite and sceptical opinions, until in 1782 he brought himself into notice by his "Observations on the three first Volumes of the History of English Poetry," in a letter to Warton, pointing out many inaccuracies. The "Observations" were answered by Warton's friends, and a literary war raged for some time, especially in the pages of the "Gentleman's Magazine." In 1783 Ritson published a volume of "Remarks, Critical and Illustrative, on the Text of the last Edition of Shakespeare," in which he attacked Johnson and Steevens; and the same year he edited "Gammer Gurton's Garland, or the Nursery Parnassus," and also published "A Select Collection of English Songs, with an Historical Essay on the Origin and Progress of National Song" (3 vols.). After this several minor works appeared, and in 1790 his "Ancient Songs, from the Time of King Henry III. to the Revolution." This was followed by "Pieces of Ancient Popular Poetry" (1791); "The English Anthology" (3 vols., 1793); a "Collection of Scottish Songs" (1794); "Poems of Laurence Minot," written in 1352 by a forgotten poet (1795); "Collection of the Robin Hood Ballads" (1795); and *Bibliographia Poetica*, a catalogue of English poets between the 12th and 16th centuries, with an account of their writings (1803). He also made a "Collection of English Metrical Romances," and wrote "An Essay on Abstinence from Animal Food as a Moral Duty." In 1791 he visited Paris, and there came near becoming a Jacobin, and even went so far as to adopt the French calendar in dating the letters addressed to his "citizen" friends.—See the "Letters of Joseph Ritson, Esq., with a Memoir of the Author," by Sir Harris Nicolas (2 vols., London, 1833).

RITTENHOUSE, DAVID, an American mathematician and astronomer, born in Germantown, Penn. (where his great-grandfather, a Hollander, had established about 1690 the first paper mill in America), April 8, 1732, died in Philadelphia, June 26, 1796. During his youth he worked on his father's farm at Norriton, but even then exhibited an inclination toward mathematical studies and mechanical art, which was strongly stimulated by coming into possession at 12 years of age of the tools and mathematical books of a deceased uncle, especially an English translation of Newton's *Principia*, which he thoroughly mastered. Before the age of 19 he had discovered the method of fluxions, and for some time regarded it as original with himself. Without any instruction he made a wooden clock before he was 17 years old, and soon afterward one of metal. These tastes and acquirements making him averse to the occupation of a farmer, his father was induced in 1751 to furnish him with the tools of a clockmaker, and for several years he ap-

plied himself with great assiduity to this employment, rating his clocks by careful astronomical observations, and continuing his mathematical studies during the hours commonly assigned to rest. His knowledge and abilities having attracted public attention, he was commissioned by the proprietary government in 1763 to determine the initial and most difficult portion of the boundary line since known as Mason and Dixon's; and this task was so well performed, although his instruments were all of his own construction, that the official surveyors on their arrival made no change in the result. Their report, however, being the chief authority upon the subject, Rittenhouse's labors upon this line are little known and seldom referred to. He was subsequently employed in determining the boundaries between New York, New Jersey, and Pennsylvania, and several other states, both before and after the revolution. In 1767 he projected a large orrery on a new and more perfect plan than had ever before been attempted; it was completed within 2 or 3 years, and purchased by Princeton college, where it still remains; and a second from the same model was made for the university of Pennsylvania. His first communication to the American philosophical society at Philadelphia was a calculation of the transit of Venus, which was to happen June 8, 1769. This phenomenon had occurred but once before during the life of any person then living, and would not occur again till 1874. It was a subject of considerable importance philosophically, and Rittenhouse was appointed with two others to observe it for the Philadelphia society, at an observatory fitted up by himself at Norriton, but furnished with instruments by the proprietary. His observation was completely successful, though at the moment of apparent contact his emotion was so great that he momentarily fainted. In 1770 he exchanged his country home for one in Philadelphia, where he continued his employments, and where his clocks and mathematical instruments acquired a high reputation. In 1777 he was made treasurer of Pennsylvania, and held that office until 1789. In 1791 he was chosen to succeed Dr. Franklin as president of the American philosophical society, and in 1792 was made director of the U. S. mint, which position he resigned in 1795, and in that year he was elected a fellow of the royal society of London. His constitution had been gradually wearing away with continued sedentary occupation, and his last illness was therefore very short, though painful. His writings consist principally of a great number of contributions to the "Transactions of the American Philosophical Society." His life has been written by William Barton (8vo., Philadelphia, 1818), and by Prof. James Renwick in Sparks's "American Biography."

RITTER, CARL, a German geographer, born in Quedlinburg, Prussian Saxony, Aug. 7, 1779, died in Berlin, Sept. 28, 1859. At 5 years of age, his mother being then a widow in destitute

circumstances with a family of small children, he was received by Salzmann as a free pupil into his school, where he passed 11 years. In 1796, by the assistance of Mr. Hollweg, a rich merchant of Frankfort, he was enabled to pursue his studies in the university of Halle, where he remained 2 years, entering Hollweg's house at the end of that period as the instructor of his children. For many years he remained at Frankfort in this capacity. His literary career commenced with some papers contributed between 1803 and 1806 to *Der Neue Kinderfreund*. In 1806 he published his 6 charts of Europe, and in 1811 his "Geography of Europe" (2 vols.). At Göttingen, whither he accompanied his pupils in 1814, he seriously commenced the preparation of his *Erdkunde im Verhältnis zur Natur und zur Geschichte des Menschen*, &c. ("Geography in relation to the Nature and History of Man, or Universal Comparative Geography as a foundation for Study and Instruction in the Physical and Historical Sciences"), of which the 1st part, containing Africa and a part of Asia, was published in 1817, and the 2d part, in which Asia was completed, in 1818. In 1819 he became professor of history at Frankfort, and in Sept. 1820, accepted a call as professor extraordinary of history in the military school and the university of Berlin, in which city he passed the remainder of his life. His activity was now chiefly directed to the preparation of a 2d edition of his *Erdkunde*, of which in 1822 he published the volume devoted to Africa, greatly enlarged and in every respect more complete than in the 1st edition. In 1825 he was appointed director of studies to the corps of cadets, and he was frequently called upon to lecture on history and geography before the crown prince and other distinguished persons. He also wrote reports for the academy of science, and brief essays communicated to the geographical society, which in 1828 he founded in connection with several friends, and of which he was the chief supporter. His vacations were devoted to travel, until there was finally scarcely any portion of western Europe which he had not traversed. In 1831 he withdrew from all occupations unconnected with his geographical studies, and subsequent to 1832 produced in quick succession that series of volumes on Asia (in enlargement of the volume on Asia in the 1st edition of his *Erdkunde*), of which the 19th was concluded but a few weeks before his death. These comprise "The Steppes of Central Asia, Siberia, China, and India" (vols. ii.-vi.), "Turan and Iran, with the Country of the Tigris and Euphrates" (vols. vii.-xi.), "Arabia" (vols. xii.-xiii.), "The Peninsula of Sinai, Palestine, and Syria" (vols. xiv.-xvii.), and "Asia Minor" (vols. xviii. and xix.), the whole accompanied by an atlas commenced by Ritter in conjunction with General von Etzel, and continued by Messrs. Grimm, Mahlmann, and Kieppert. His works, in addition to those already mentioned, are numerous and important.

RITTER, HEINRICH, a German author, born in Zerbst in 1791. He studied philosophy at the universities of Halle and Göttingen, served as a volunteer in the German army in the campaign of 1813, and completed his education at Berlin. His chief work, "General History of Philosophy" (12 vols., Hamburg, 1829-'53), with its supplement, "Essay on Modern German Philosophy since Kant" (Brunswick, 1853), is a *résumé* of the philosophical studies of his whole life. His minor treatises are numerous. He occupies an independent position in the field of speculative philosophy, and is in principle an eclectic. Several of his works have been translated into French and other European languages. An English translation by Morrison of his history of ancient philosophy has been published at Oxford in 4 vols. 8vo.

RIVAROL, ANTOINE, count de, a French author, born at Bagnols, Languedoc, April 7, 1753, died in Berlin, April 11, 1801. A man of poor but noble origin, he gained admission to the highest society in Paris, where his wit amused and his satire was dreaded. His literary performances were few and ephemeral, including his *Discours sur l'universalité de la langue Française*, which won a prize at the academy of Berlin in 1784; a free translation of Dante's *Inferno*; and his *Petit almanach de nos grands hommes* (16mo., 1788), a satirical biography of men who then aspired to fame. When the revolution broke out, he bitterly assailed the democrats, and soon took refuge in England, and then in Germany, where he lived mostly at Hamburg and Berlin. After the revolution of the 18th Brumaire, he solicited permission to return to France, but died before it was granted. A collection of his works was published (5 vols. 8vo., Paris, 1805), and his select works under the title of *Esprit de Rivarol* (2 vols. 12mo., 1802 and 1808). He wrote an introduction to a *Dictionnaire de la langue Française*, which appeared prefixed to another's work in 1828.

RIVAS, ANGEL DE SAAYEDRA, duke of, a Spanish statesman and author, born in Cordova, March 1, 1791. In 1807 he entered the royal body guard, and at the commencement of the war of independence in 1808 attached himself to the national cause, received 11 wounds in the battle of Ocaña, and was taken prisoner at Malaga, but escaped. At the close of the war he retired with the rank of colonel. In 1813 he published a volume of poems, of which a new edition appeared in 1820-'21, with additions. At the revolution of 1820, he declared himself in favor of the constitution of 1812, and was elected the next year a member of the cortes from Cordova. In 1823 the counter-revolution compelled him to escape to Seville, and finally to fly the country. He first sought an asylum in England, where he occupied himself with literary pursuits; and in 1825 he embarked with his family for Italy, but the governments of Rome and Tuscany would not allow him to remain on their territory. At the beginning of 1830 Charles X. interdicted

his residence in Paris. Reduced to poverty, he maintained himself by painting and giving lessons. Some of his large pictures are now in the cathedral at Seville. The amnesty of 1834 enabled him, after 11 years' exile, to return to Spain. In 1835 the death of his elder brother gave him the estates and titles of his family. In May, 1836, he received the portfolio of the interior in the cabinet of Isturiz. In 1837 he was again in exile, and remained abroad during the administration of Espartero; but he returned to Spain in 1843 with Queen Christina, and was appointed ambassador to Naples, which office he retained till 1848, being recalled on the occasion of the marriage of a Neapolitan princess with the count of Montemolin. In July, 1854, he was one of the "ministry of 40 hours," which overthrew the coalition of O'Donnell and Espartero. He subsequently became Spanish minister at Paris. His published works include *Florenda*, an epic poem on the Moorish conquest (Madrid, 1824-'5); *Lanuzza*, a tragedy (1823); *Don Alvaro*, a tragedy (1835); several comedies; *Romances historicas* (2 vols., Paris, 1841); *Historia de la sublevacion de Napoles* (2 vols., Madrid, 1848), &c.

RIVER (Lat. *rivus*, a stream), a large current of water flowing through the land and discharging itself either into the sea, a lake, or another river. In the economy of nature rivers are the channels by which the waters that fall upon the surface of the earth find their way back to the sea, whence being raised by evaporation they are again distributed in rain and dew to refresh the lands and promote vegetation. Next to mountains and seas rivers are the most marked topographical features of the surface of the earth. In the elevated lands the water courses begin in rills that issue from the slopes, or are formed from the rains that fail to penetrate the ground, and one joining another the rivulets become brooks, and enlarging in their progress toward the sea they increase to rivers. Their course is directed by the geographical and geological features of the country. Tending to flow down the lines of most rapid descent, the currents are directed by local slopes alone, and diverted by obstructions which they cannot break through. The intervention of a mountain ridge may turn them along its line till a gap presents itself by which the river passes to the other side of the mountain and thence takes its more direct course to the sea. Instances of this feature are common in all regions of long continuous chains and ridges, and among the most remarkable are two on the N. side of the Himalaya. The main branch of the Brahmapootra, called the Sanpoo, is shut off from a straight approach to the sea and diverted for 700 m. on the further side of this range of mountains, till it reaches a point where they flatten away, and there passing through the range turns on its S. side almost in an opposite course. The Sinde or Indus, rising in the same region with the Sanpoo, flows several hundred miles in

the contrary direction along the same side of the great barrier, through which it also finds a passage at last on its way to the Indian ocean. In California the rivers San Joaquin and Sacramento are in like manner shut off from the sea by a range of mountains, and flow several hundred miles in the parallel valley beyond the range; but in this instance their course is toward each other till they come together against the opening through which the waters find a short outlet to the bay of San Francisco. The side branches which feed these rivers come chiefly down from the steep slopes of the Sierra Nevada in deep transverse valleys, which they appear to have themselves excavated. The S. side of the Pyrénées, cut into by the branches of the Ebro, presents similar features, and the serrated outline of the alternating crests and depressions gives to these mountains also the name of sierras. The region of the Alleghanies is especially remarkable for long straight valleys included between parallel ridges, each valley having its own river, which often runs for many miles without finding a gap for its passage into the next valley. The smaller streams are for the most part thus held in the valleys until they join one of the larger rivers, as the Juniata, the Potomac, or the James river, the general course of which is across the range of the mountains, and which appears to have been established by a persistent struggle, the river turning here around the point of one mountain and through a break in the next, then quietly ranging along the valley in search of another opening through a third ridge, and thus gradually working its way by a devious route down the general slope to the ocean. The great lines of drainage occupied by these rivers were without doubt all marked out when the lands emerged from the sea in which the piles of strata that now form its hills were built up. The flowing off of the waters opened the gaps from the summits down, removed the materials back into the sea, and impressed those singular outlines upon the surface which flowing water must necessarily leave upon piles of strata of variable consistency, like the hard sandstones, the soft limestones, and loose shales. (See APPALACHIAN MOUNTAINS.) So marked is the connection between the geological structure of portions of this region and the rivers, that upon a good map the direction of the dip of the strata may sometimes be detected by the parallel course of a number of branches which evidently are flowing down their slope. Great dislocations of the surface also sometimes determine the course of rivers. Thus the Hudson in the lower part of its course follows that which is marked by the great trap dike known as the Palisades, and the Zambesi, as described by Dr. Livingstone, is compressed below the Victoria falls into a deep narrow gorge in the basaltic rocks and turned in a new direction.—The supplies of water furnished to a river vary with the season, and are dependent upon the geographical position and extent of its basin,

this term including all the area it drains. The Amazon is most favorably situated for receiving vast quantities of water, its basin being along the equator and in the region of the tropical rains. The Nile near its sources receives these rains during the summer months, but particularly in September, and to them are due its inundations, which occur at this season and subside after the autumnal equinox. In temperate latitudes, the rains not falling periodically, the fluctuations of the rivers are more irregular; those, however, like the Mississippi, whose sources in the far north are dependent upon the melting snows and ice, are at their height after the spring thaws, and low during the summer. In Siberia, where the thaws at the sources of the rivers occur when the lower portions are still closed by ice, the descending waters often sweep over the frozen surface and over the surrounding lands, carrying with them forests and immense quantities of earthy materials mixed with ice. Thus the land is often desolated and new channels are made for the rivers. In North America, Mackenzie's river is situated similarly to those of Siberia. Rivers which are fed from large lakes are more uniform in their flow, and of these the St. Lawrence furnishes the most remarkable instance. The great lakes are a vast reservoir in which the excess of one season or locality is balanced by diminished supplies in another, and the fluctuations are equalized before their effects can reach the distant point of discharge. The basins of all rivers perform this office to some extent, the pervious soil absorbing the waters which beneath the surface gather in innumerable little channels, and at last make their appearance at lower levels in gushing springs, many of which, so large is the area of supply and so deep the collection of the waters, scarcely fluctuate through the changes of the seasons. These are apparently so insignificant, it was not long ago believed by many that they were altogether inadequate to account for the enormous quantities of water poured forth from the mouths of the streams, and that some other means than evaporation were in operation by which through subterranean channels the waters of the sea were returned fresh to the rivers. But the competency of the springs through their incalculable numbers to produce the effects observed is no longer questioned.—The great rivers of the earth for the most part have their source upon the slopes of mountainous regions remote from the sea. Such is the Amazon, which rises on the eastern slope of the Andes and pursues its course across the continent of South America. The Missouri likewise, rising on the same slope of this range extended into North America, pursues its course for 3,096 m. to the Mississippi, and thence 1,400 m. further to its outlet in the gulf of Mexico. The Hoang-ho and Yang-tse-kiang of China and the Asiatic Amoor are rivers of similar character, following like the others named an easterly course. Not inferior to some

of them in length are the great rivers of Siberia, the Lena, Yenissei, and Obi, that rise in the mountains of central Asia and reach the Arctic ocean after a flow of from 2,400 to 2,800 m. toward the N. Flowing in the same direction

and for equal length, but rising in the equatorial region of Africa, is the Nile, whose outlet is in the Mediterranean sea. The principal rivers of the world are arranged in alphabetical order in the following table:

Rivers.	Country.	Rise.	Discharge.	Length, miles.
Amazon.....	Brazil.....	Andes.....	Atlantic.....	3,944
Amoor.....	Mongolia.....	Khan Oia mountains.....	Sea of Okhotsk.....	1,690
Brahmapootra.....	Thibet.....	Himalaya mountains.....	Bay of Bengal.....	1,400
Columbia.....	North America.....	Rocky mountains.....	Pacific ocean.....	1,200
Congo.....	Africa.....	Lake Aquilunda.....	Atlantic ocean.....	1,400
Danube.....	Germany.....	Black Forest.....	Black sea.....	1,770
Dnieper.....	Russia.....	Heights of Smolensk.....	Black sea.....	1,100
Euphrates.....	Asiatic Turkey.....	Mountains of Armenia.....	Persian gulf.....	1,750
Ganges.....	Hindustan.....	Himalaya mountains.....	Bay of Bengal.....	1,500
Hoang-ho.....	China.....	Koukoun.....	Yellow sea.....	2,500
Indus.....	Hindustan.....	Himalaya mountains.....	Arabian sea.....	1,814
Irrawaddy.....	Burmah.....	Mountains E. of Assam.....	Bay of Bengal.....	1,060
Jaxartes or Sihon.....	Coorkistan.....	Kirghiz highlands.....	Sea of Aral.....	900
Jumna.....	Hindustan.....	Himalaya mountains.....	Ganges.....	860
Lena.....	Siberia.....	Heights of Irkootsk.....	Arctic ocean.....	2,403
Mackenzie.....	British America.....	Rocky mountains.....	Arctic ocean.....	2,500
Maykuang.....	Burmah.....	Thibet.....	Chinese sea.....	1,700
Mississippi.....	United States.....	Lake Itaska.....	Gulf of Mexico.....	2,986
Missouri.....	United States.....	Rocky mountains.....	Mississippi.....	8,096
Murray and Darling.....	Australia.....	Australian Alps.....	Encounter bay.....	8,000
Niger.....	Soodan.....	Base of Mt. Loma.....	Gulf of Guinea.....	2,500
Nile.....	Africa.....	Ethiopia.....	Mediterranean sea.....	2,750
Obi.....	Siberia.....	Altai mountains.....	Arctic ocean.....	2,800
Ohio.....	United States.....	Alleghany mountains.....	Mississippi river.....	950
Orange or Garoep.....	South Africa.....	Mts. N. W. of Port Natal.....	Atlantic ocean.....	1,050
Orinoco.....	South America.....	Mountains of Spanish Guiana.....	Atlantic ocean.....	1,500
Oxus or Jihoon.....	Toorkistan.....	Lake Sirikol in Khoondooz.....	Sea of Aral.....	1,100
Plata.....	South America.....	S. W. of Brazil.....	Atlantic ocean.....	2,500
Red River.....	United States.....	Texas.....	Mississippi river.....	1,200
Rio Grande del Norte.....	North America.....	Sierra Verde.....	Gulf of Mexico.....	1,500
St. Lawrence.....	Canada.....	Great Lakes (inclusive).....	Atlantic ocean.....	1,910
Volga.....	Russia.....	Lake in the Volhonskol forest.....	Caspian sea.....	1,900
Yang-tse-kiang.....	China.....	Thibet.....	Chinese sea.....	2,700
Yenisei.....	Siberia.....	Altai chain.....	Arctic ocean.....	2,500

The areas of drainage of most of these rivers are given in this work in the articles which treat of them individually, to which the reader is referred. The greatest is that of the Amazon, estimated to include over 2,000,000 sq. m. Next to this come the Mississippi, Obi, &c.—The rate at which a river descends depends upon other circumstances beside the mere declivity of its bed. A shallow stream may slowly make its way down a channel through which deep waters rush with impetuous velocity. In the one case the obstacles which impede the current act upon a larger proportion of the water, and in the other the main body is carried down upon the slightly resisting portions of the current that move more slowly along the bottom and against the sides. The swiftest portion of a river is the middle of the stream, and a little below the surface. Along the margins, and especially round the curves, a back current called an eddy is frequently found, caused by the waters that rushed down the middle of the stream being in part turned back to fill the depression at the side. Boats ascending rivers take advantage of this featuro by keeping near the shore, while those going down follow the middle of the current. The magnitude of rivers is subject to great fluctuations, caused by the varying dimensions and slopes of their beds rather than by the varying quantity of water carried forward. This is seen in a remarkable degree in the current of the Niagara compressed in the narrow channel below the falls, where great depth and swiftness of current

compensate for diminished width. The Zambesi, before referred to, is a still more remarkable instance, its current above the falls being 3,000 feet wide, and below being compressed into a deep gorge about 50 feet wide. The breadth, depth, and velocity of rivers are thus to some extent convertible features, and it is perceived how the accession of another current may fail, as often occurs, to produce a proportional increase of width. It is more commonly the case that the bed is deepened and the flow accelerated. Thus rivers gain in depth rather than width by the accession of their tributaries. The movement of the waters is greatly affected by the course of rivers, whether nearly uniform or frequently changing, and also by the nature of the obstacles presented on the bottom and at the sides. Streams of rapid descent tend to force a straight passage, and obstacles are swept away before them which upon a more horizontal surface would cause them to deviate from their course. Thus it is that over the great plains, through which many rivers flow, as those of South America particularly, the currents have been turned in one and another direction, causing great bends, around which the voyager after being carried many miles is brought back within a very short distance of the point before passed. In inundations the bends obstructing the discharge cause the waters to overflow, and often open new and more direct channels. Instances are described in the article MISSISSIPPI RIVER, upon which stream they are known as "cut-



offa." In very level regions different river systems are sometimes brought in these convolutions near to each other, so that indeed in a few instances they have been known to unite together. The Orinoco thus at some distant period reached the basin of the Amazon, and has been subsequently connected with it through what is now an important branch, the Cassiquiare, which after a course of 120 m. from the main river discharges itself into the Rio Negro, a branch of the Amazon; and as the navigable waters of the Amazon approach within 3 m. those of the Paraguay, there is with only this interruption a continuous communication by navigable rivers from the mouth of the Orinoco, in lat. 9° N., to the mouth of the Paraguay, in lat. 35° S. In this region of plains the descent of the Amazon for the last 700 m. of its course amounts to only 12 feet, or about an inch in 5 m. Notwithstanding this almost imperceptible descent and the great capacity of the river, which more than 2,000 m. above the mouth is from 1 to 2 m. wide and over 200 feet deep, its current flows from 1 to 4 m. an hour, so immense is the quantity of water that is pushed forward to the sea. Rivers in general descend most rapidly near their sources, but the slope, dependent on the geological structure of the country passed over, is usually variable in different parts of the course of a river. Those rivers of this country which flow into the Atlantic through the middle and southern states, in passing from the platform of ancient crystalline rocks to the lower and more recent deposits of the secondary and tertiary which skirt the ocean, make a sudden descent, and the rapids or falls thus formed determine the head of navigation on all these streams. A line passing through the cities situated at these falls, as Trenton on the Delaware, Philadelphia on the Schuylkill, Havre de Grace at the foot of the rapids of the Susquehanna, Georgetown on the Potomac, Fredericksburg on the Rappahannock, Richmond on the James river, Augusta on the Savannah, &c., is a geological line marking the lower margin of the azoic rocks. Over these formations, which commonly present the greatest irregularities of surface, the rivers are usually most obstructed in their flow by rapids and cataracts. The great navigable rivers of the globe are chiefly in regions of stratified rocks, or as in South America in alluvial plains. The slope of their bed varies from nearly a dead level to several inches in a mile. That of the Mississippi for the lower 400 m. is about 2 inches to the mile, and the velocity of the current about 2 m. an hour. The lower portion of the Ganges is said to fall about 4 inches a mile, and flow from 3 to 5 m. an hour; the Nile, between Asswan and Cairo, 6½ inches a mile; and the Thames, from Chertsey to Teddington Lock, 17½ inches.—An important office performed by rivers is the transportation of earthy matters from high levels and their distribution over the low places of the earth. Lands are enriched by the fertilizing sediments

spread over them in the periodical overflows, and about the mouths of the larger rivers, spreading far out into the sea, extensive strata of sands, clays, and calcareous matters are slowly accumulating, of similar character to those which constitute a large portion of the surface upon which we live. The sediments annually brought down the Mississippi have been estimated as equal to a deposit of a foot in thickness over 12 sq. m. The waters of the Ganges and Brahmapootra come more highly charged with sediments on account of their more rapid descent and the more violent rains that fall about their sources, and their deposits exceed many times those of the Mississippi. The sediments are spread out to a distance of 100 m. or more from the land, the waters of the bay of Bengal being evidently discolored by them even at this great distance. The quantity annually discharged from the mouth of the river has been computed equal to a layer one foot thick over a tract of 15 m. square, or 225 sq. m. Being spread by the currents over vast areas, the effect of such deposits in shoaling the waters is unnoticed in the short period of observation of a single generation; but in the long past periods during which the rivers have flowed the results are stupendous. Egypt, or at least the habitable part of it, was called by the ancient priests of that country the gift of the Nile. Not merely the delta at its mouth, but the alluvial plains above, were at some period produced by its deposits, and the same may be said of the plains as well as of the deltas of the Mississippi and the Ganges. The deltas still obviously in process of formation and extension into the sea, though too imperceptibly for their progress to be detected, are striking features about the mouths of the rivers named. That of the Ganges is shared by the Brahmapootra, which streams, over the vast area extending more than 200 m. back from the sea and estimated equal to the whole principality of Wales, form a network of rivers and creeks, increasing in numbers as they approach the bay. There are recognized as many as 8 large channels of discharge, each of which appears to have been at some time the principal one. When the rivers are high this whole district is submerged beneath the fresh water; at other times salt water flows in from the sea, filling all but the main channels of the rivers, and the tide is then felt to the head of the delta. The lands are covered with dense jungles occupied by tigers and crocodiles. The Nile and the Mississippi also separate into several arms in passing through their deltas. But the Amazon enters the sea by one large channel divided only by an island, and widens out into a bay of 180 m. in width. This no doubt is kept open by the impetuous movements of the tides alternately contending with and pushed down by the immense flood of waters, in which movements the fine muddy sediments are kept in suspension until they are in great part carried many hundred miles out to sea.—Some

rivers flow into lakes which have no outlet. Thus the Caspian sea receives a number of rivers, one of which, the Volga, is among the great rivers of the earth. Another example is the Dead sea fed by the river Jordan. The surface of both of these lakes is lower than that of the Mediterranean, so that there can be no discharge by subterranean channels. This takes place, as in the ocean itself, by evaporation. A river sometimes disappears in the earth and flows many miles beneath the surface; it however usually appears again at a lower level. Such instances commonly occur in limestone regions, this rock being rapidly worn into cavities and channels by the soluble property of water.

RIVER HOG. See WART HOG.

RIVERS, WILLIAM J., an American educationist, born in Charleston, S. C., in 1822. He was graduated at the South Carolina college in 1841, of which in 1856 he was elected professor of Greek literature, having for a number of years previous conducted a large private school. He is the author of a "Sketch of the History of South Carolina to the close of the Proprietary Government" (1856), and of a number of contributions to the periodical press of South Carolina. He has also a considerable local reputation as a poet.

RIVET, a metallic pin or bolt used for fastening pieces of metal or other materials firmly together. Rivets are made of a great variety of sizes for the different works for which they are intended. The jeweller forms them by clipping off short pieces of wire, and introducing one of these in a hole drilled through the two surfaces he designs to secure together, he spreads and flattens the ends by a small riveting hammer, so that neither can draw back through the hole. Leather belts for machinery are very neatly secured together by rivets, which are largely prepared in the form of short copper bolts with broad heads, and are sold with the little copper washers which are intended to serve as heads for the small ends. The copper being soft and ductile and the washers exactly fitting, a single blow upon the riveting set or punch is sufficient to spread the end and give it a firm hold upon the washer. Rivets of this kind, and multitudes of others of copper, brass, and iron, are manufactured upon a large scale by a number of machines variously planned. In general the principles of their operation resemble those of the pin-making machines already described. (See PIN.) The wires or rods, being clipped into the short lengths called blanks, are shaped and headed either cold or hot in dies, under heavy pressure, at one operation. The great demand for them is for securing together the sheets of plate iron in constructing boilers for steam engines and other apparatus of this material, as iron buildings, gas holders, &c. Large manufacturing establishments in different cities and towns in the United States are kept in operation producing rivets for these and other purposes. The daily

capacity of the Philadelphia rivet works is about 5 tons of boiler rivets, and 3,000 lbs. of smaller sizes. Every first class locomotive requires for its boilers and fire boxes about 2,000 rivets, weighing 500 lbs., and the tender uses about 150 lbs. of smaller sizes. The great gas holder in Philadelphia (see GAS) consumed about 1,000,000 rivets, weighing about 6 tons; and an iron lighthouse in Florida was also supplied with about 6 tons. In England the demand is much greater than in the United States, enormous quantities being required for iron bridges, especially for the Britannia tubular bridge, and the Victoria bridge over the St. Lawrence at Montreal, and also for the great number of iron ships, the consumption of them by the Great Eastern alone being immense. The rods for boiler rivets are carefully tested both hot and cold, and those that show defects that would endanger the separation of the shanks from the head by contracting as they cool after being set, are rejected. The best sorts of iron wire are selected for the smaller rivets, and after these are made they are annealed, so that they can be headed cold with the same facility and security as if they were of copper. Large rivets for boilers are headed by hand with hammers, and the work is also done by powerful machines, which can be made to exert a sudden pressure of 80 tons or more against the end of the rivet. By the hand method a man in the inside of the boiler introduces a red-hot rivet through the hole already punched in the overlapping plates, and holding a heavy hammer against the head, two men on the outside by alternate blows batter down and head the projecting end in a conical form. The machines that have been contrived for this work also shear the plates and punch the holes through them for receiving the rivets. Several machines of French and English invention, worked by steam power, have been patented; and with that of Messrs. William Fairbairn and co. of Manchester, it is stated that two men and two boys attending to the plates and rivets can fix in the firmest manner 8 rivets of  $\frac{1}{4}$  inch diameter in a minute, while by the common process of hand riveting 8 men and a boy can rivet only 40 an hour. The rivets are placed red-hot in the holes, the movement of the machine allowing this to be done, and the plates are brought into proper position for receiving the pressure between each stroke.

RIVINGTON, JAMES, a royalist printer of New York during the revolution, born in London about 1724, died in New York in July, 1802. Early in life he was a bookseller in London, and at that business acquired considerable wealth, which however he lost at Newmarket. In 1760 he came to America, and opened a shop in Philadelphia, but in 1761 established himself in New York, and on April 22, 1773, began the publication of a newspaper entitled the "New York Gazetteer, or the Connecticut, New Jersey, Hudson's River, and Quebec Weekly Advertiser." "His ever open and uninfluenced

press" advocated the cause of the English government with great zeal, and severely attacked the patriots. In 1775 he seems to have been placed in confinement by order of congress, as he addressed to that body at that time a remonstrance, "humbly presuming that the very respectable gentlemen of the congress now sitting at Philadelphia will permit him to declare, and, as a man of honor and veracity, he can and does solemnly declare, that however wrong and mistaken he may have been in his opinions, he has always meant honestly and openly to do his duty as a servant of the public." In Nov. 1775, in consequence of his constant assaults upon the republicans, and especially Capt. Sears, that officer came from Connecticut with a company of 75 horsemen to New York, proceeded to Rivington's printing office, destroyed the press and other apparatus, and putting the types into bags carried them off and converted them into bullets. Rivington then went to England, and being appointed king's printer in New York, returned with a new press after the city had fallen into the hands of the British, and in Oct. 1777 resumed the publication of his paper under the old title, which was not long after changed to "Rivington's New York Loyal Gazette," and on Dec. 13 to the "Royal Gazette." About 1781, when the success of the British was becoming very doubtful, he played the part of a spy, furnishing Washington with important information. He wrote his communications on very thin paper, which were bound in the covers of books, and were then conveyed to the American camp by agents ignorant of the service. When therefore New York was evacuated, Rivington remained in the city, much to the general surprise. He took down the royal arms from his paper and changed the title to "Rivington's New York Gazette and Universal Advertiser." His business however rapidly declined, his paper was soon stopped (1783), and he passed the remainder of his life in comparative poverty. There is a complete set of this journal in the library of the New York historical society.

RIZOS RANGABES, or RHIZOS RHANGAVES, ALEXANDROS, a Greek author, orator, and statesman, born about 1810. He is the son of Jacobos Rizos Rangabes, who translated some French plays into Romaic, and he early chose literature for his own profession. He published at Athens in 1837 a volume of poems entitled *Διαφορα Ποιηματα* ("Various Poems"), and some tragedies in 1840. He also made several translations from ancient into modern Greek, one of which was the first book of the Odyssey. In prose he has written works which are chiefly of a historical or antiquarian character, and in 1840 he made a Greek version of Goldsmith's "History of Greece" for the use of schools. In 1842 he published in French the first volume of a work entitled *Antiquités Helléniques*, which contained notices of the inscriptions and other antiquities which have been discovered since the liberation of Greece. Subsequently

he became secretary of the archæological society at Athens, a professor in the university founded by King Otho, and in 1856 minister of state for foreign affairs, which position he held until 1859.

RIZZIO, or RICCI, DAVID, a favorite of Mary Stuart, queen of Scotland, born in Piedmont in the early part of the 16th century, assassinated in Edinburgh, March 9, 1566. He was the son of a poor musician of Turin, and, having learned his father's art, had gone to the court of the duke of Savoy, and went to Scotland in the suite of the ambassador from that country, who had selected him on account of his abilities as a linguist. He was made by Mary one of the pages of her chamber, and after the removal of Raulet he became, in Dec. 1564, her secretary for the French language. All her foreign correspondence passed through his hands, and upon her marriage with Darnley he was appointed keeper of the privy purse to the king and queen. In this station his low birth, his religion, and his arrogance aroused the suspicion and indignation of the nobles and the Protestant clergy. An agreement was made between Morton, Ruthven, Lindsay, and Maitland, and others who had been secretly engaged in the late conspiracy against the throne; and the king, cordially hating Rizzio, who adhered to the side of his mistress in every domestic quarrel, was taken into their counsels. It was suggested to the weak Darnley that the queen had transferred her affections from him to Rizzio, and he was persuaded to take measures to have him put to death. After their arrangements had been completed, Morton took possession of the gates of the palace with a band of armed men. Darnley entered the queen's room, sat down beside her, and placed his arm around her waist, while the other conspirators followed. Ruthven replied to Mary's command to leave the room, that his errand was with David. Rizzio for protection sprang behind his sovereign, exclaiming: *Justitia, justitia!* Neither her prayers nor commands availed to save the unfortunate secretary, who was stabbed in her presence, dragged through the bedchamber into the adjoining room, and there despatched with 56 wounds. The common story that Rizzio was one of the queen's musicians, if not entirely false, is doubtful; and though popular tradition assigns to him the improvement of the Scottish style of music, many of the airs of which he was said to have been the author belonged to periods more remote.

ROACH, a fish of the carp family (*cyprinidæ*), and genus *leuciscus* (Klein). The generic characters have been given under DACE. The common roach of Europe (*L. rutilus*, Klein) attains a length of 10 to 15 inches; the upper part of the head and back is dusky green with blue reflections, lighter on the sides, and silvery white below and on the cheeks; the pectorals orange red, ventrals and anal bright red, and the dorsal and caudal pale brown tinged with red. The muzzle is rather sharp, and the

month small with soft lips; there are hooked teeth in the pharynx, and the abdomen behind the ventrals is somewhat keeled; there is a single dorsal in the middle of the back, over the ventrals, which, with the anal, has no bony ray; the nape and back rise suddenly; the scales are large, with concentric and radiating lines, 43 on the lateral line, which falls by a curve from the upper part of the gill cover below the middle of the body, and thence is nearly straight to the tail. It is found in large shoals in the still rivers and lakes of temperate Europe, and feeds on worms and aquatic plants; it is caught abundantly in the Thames, going high up the river in May or June to spawn, but is best for food and finest in color in October; it is not however much esteemed, and the proverb "as sound as a roach" is derived from *roche*, the old French name of this fish, the true meaning being "as sound as a rock." The beautiful dace of New England (*L. [leucosomus] pulchellus*, Girard) resembles the European fish, and hence is often called roach; this name is also applied to the bream (*pomotis vulgaris*, Cuv.); it is frequently also used as an abbreviation of cockroach.

ROAD, a pathway through the country prepared for the passage of men, animals, and carriages, or the transportation of commodities. In all civilized countries roads are objects of the first necessity. The earliest settlers in their explorations determine the most feasible routes from one point to another, marking the trees along the line through the forests as guides until the path becomes worn. This they may gradually improve by removing obstructions, filling up depressed places, building bridges, and cutting down the steep acclivities, till the path becomes a road passable for carriages. The more perfectly it is made, the less are the difficulties of transportation, the more cheaply are the people provided with supplies from abroad, and the greater is the value of their own products that are to find a distant market. As the population increases, means are afforded for increasing, extending, and perfecting the roads; and from the attention given to these in any country, one may form a tolerably correct estimate of the comparative degree of civilization and enterprise of its inhabitants. In ancient times the great roads were laid out and constructed almost exclusively by order of governments of states, and very generally for military purposes. In the article PAVEMENT an account is given of the permanent character of some of the paved roads of the ancient Romans, and also of some similar works accomplished by other nations. The Romans, from the time of Julius Caesar, exhibited a wonderful appreciation of the importance of roads and skill in their construction. They opened them with vast expenditure of labor through the provinces they captured, and maintained lines of communication of this character throughout southern and western Europe, extending through portions of Africa and Asia. The islands of the Mediterranean

were crossed by their roads, and in England a main line was built through the country N. and S., and another from E. to W. No pains were spared in giving to these works a permanent character, and the thorough manner of their construction, not surpassed in the roads of modern times, is proof of their extraordinary engineering skill in this department. The Britons failed to keep up the roads made by the Romans or to construct new ones, and for centuries they continued to make use of foot or bridle paths, such as are employed only in the most thinly settled portions of the United States. Even as late as the latter part of the 17th century no interest had been taken by the government in establishing good roads, and the first turnpike act was in the 16th year of Charles II. Up to the middle of the next century no systematized operations were perfected for constructing and keeping up the roads; and in Scotland the transportation of goods was effected chiefly by pack horses. The time consumed in the regular trips of the carriers seems now hardly possible, when a voyage across the Atlantic is made in a less number of days than they ordinarily occupied in a trip of 88 m. and back, as between Selkirk and Edinburgh. In 1763 only one stage coach ran between Edinburgh and London, making the journey from one place to the other in two weeks. In 1770 the journey from Liverpool to Manchester, according to the account of Mr. Arthur Young in his "Tour," must have been not a little perilous. He seriously cautions all travellers to avoid it, and speaks of having measured ruts floating with mud 4 feet deep. But within the next 60 years, when the manufacturing resources of the country, through the developments of the steam engine and the coal mines of England, were brought into action, the progress in the construction of roads was very remarkable, and Great Britain became famous for their excellence and the facilities of rapid communication they afforded. In the United States, the importance of roads for military purposes, leading into the interior territories and to the frontier at various points, was early appreciated, and some important routes were opened by the general government, as the national road from Baltimore through Wheeling, Cincinnati, &c., to St. Louis, and the military road from Bangor to Houlton in Maine. The opening of these avenues into regions difficult of access proved of great importance, not merely as facilitating the transportation of government troops and stores, but still more for hastening the settlement of the neighboring lands by the introduction of emigrants, and thus adding largely to their value. These results have given no little encouragement to the prosecution of similar enterprises on a more moderate scale by individual land owners and companies.—In laying out a new road, the first requisite to secure the most favorable route is always a reconnaissance of the region between the two termini; and the objects to

be kept in view in selecting the ground are: 1, the shortest distance; 2, the most level ground; 3, that best adapted for a hard road bed; and 4, proximity to the proper materials for constructing this, as beds of gravel, quarries of suitable stone, &c. In every selection of a route these points, and especially the first two, have to be carefully considered, and compromises made between them, according to the judgment of the engineer, who is governed also by the prospective importance of the road and the amount of money that may be expended upon it. The system of construction resembles that adopted for railroads, requiring cutting through the more elevated points and using the material to fill up the adjacent depressions; and the most important roads may admit these of great extent for the sake of straightness and easy grades, and may also cross difficult streams and marshes by costly bridges, when roads of inferior importance would pursue a more devious route, vertically and horizontally, for the sake of the smaller outlay involved. An undulating road, with slopes so gentle that the load may not press upon the horse or the brake in descending, as from 40 to 70 feet to the mile, is decidedly preferable to a dead level on account of its better drainage; and this degree of slope varies with the quality of the road from 1 in 30 or less on inferior roads to 1 in 40. If power has to be applied to keep the load from descending, the advantage gained by gravity is nullified to this extent, and cannot be reckoned as compensating for the increased labor in the ascent, as might be the case if the slope were within what is termed the "angle of repose." In deciding upon the maximum slopes that shall be allowed, and the deviations or zigzags to be adopted in order to avoid them, consideration should be given to the direction of the principal transportation and the loads that are to be drawn up. It is found in round numbers that upon a slope of 1 in 44, or 120 feet to the mile, a horse can draw only  $\frac{1}{2}$  as much as he can upon a level; on a slope of 1 in 24, or 220 feet to the mile, only  $\frac{1}{3}$  as much; and on a slope of 1 in 10, or 528 feet to the mile, only  $\frac{1}{4}$  as much. These proportions of course vary with the conditions of the road; the smoother and harder it is the less is the frictional resistance, and the greater is the proportional share of gravity in the total resistance to be overcome. In general the following rule is established: that the longitudinal slopes of a road should be kept as far as possible between 1 in 30 and 1 in 125, never steeper than the former nor nearer to a level than the latter. Roads over steep acclivities may hence be advantageously elongated to secure gentle slopes, and it is for the engineer to determine to what extent this shall be, in order that the greatest load may be transported in the shortest time. In the United States important roads have been laid out with maximum slopes as steep as 1 in 11, and this has been allowed to several chartered turnpike companies in the state of New York.

Upon the great Holyhead road through the mountainous district of N. Wales the maximum slope is 1 in 80, except at two points, where it is respectively 1 in 22, and for a very short distance 1 in 17, and in these the surface is made particularly hard and smooth. By this precaution the same load which is adapted to the other portions of the road may be taken up these ascents without very much greater exertion of the horses. On the famous road by the Simplon pass over the Alps, the slopes on the Italian side average 1 in 22, and on the Swiss side 1 in 17; in only one spot is it so steep as 1 in 13. The width of roads is very variable. The minimum was that of the old Roman roads, 12 feet when straight, and 16 when crooked; and the maximum is rarely more than 100 feet, which is occasionally given to very important highways, and of which nearly half is then devoted to a wide footpath on each side. A wider space is usually cleared in opening a new road than is used for the road itself. This is essential in a wooded country in order to let in the sun and air for assisting to keep the surface dry, and also to lessen the liability of the way being obstructed by fallen trees. The United States national road was opened 80 feet wide, but only 30 feet was finished for travelling on. Three rods ( $49\frac{1}{2}$  feet) is a common width in the state of New York. In England turnpike roads approaching populous towns are required to be 60 feet wide; but common carriage roads are often only 20 feet. Two rods (33 feet) is really wide enough for convenience of travel on common country roads, allowing a foot path on one or both sides; and a road of this width is much more easily kept in repair than one spread out over a broader surface. It is often the case that, however wide a road is originally made, only a limited belt along the middle portion is kept in a finished state.—Several sorts of roads are recognized, distinguished by the manner of their construction. In uncultivated regions, the natural surface is often used with no other preparation than rendering it merely passable to wheeled carriages. When the surface is prepared by levelling the earth, the road is commonly known as a dug road or earth road; covered with gravel, it is sometimes known as a gravel road, and with broken stone as a macadamized road. The preparation of earth roads consists chiefly in breaking up the surface with ploughs, throwing out all coarse materials, as large stones, roots, &c., and with scrapers drawn by cattle raising the surface in the middle, so as to present a slope on each side to the ditch excavated along the line. Outside the ditch is the foot path, when one is prepared at all. Upon gravelly soils tolerably good roads are thus easily made; if the soil is sandy, an addition of clay is beneficial; and if clayey, of sand. In limestone districts earth roads are good (saving the dust) in dry weather; but in wet weather, and especially in the spring thaws, they are excessively mud-

dy. This is also the case with all soils abounding in vegetable matter. Earth roads are benefited by the use of broad-tired wheels, which act as rollers to consolidate the surface. Upon the turnpikes of New York carriages with 6-inch tires are allowed to pass at half the ordinary toll; those with 9-inch wheels pay only one fourth; and those with 12-inch tires go free. The best gravel roads are made with a natural mixture of pebbles and earth sifted, rejecting all that will not go through holes of  $1\frac{1}{4}$  or 2 inches, and all that does go through  $\frac{3}{4}$ -inch holes. A covering of the selected portions should be spread over the earth road to the depth of 4 inches, and after it has been well rolled or travelled upon for some time while the ruts have been continually filled as they appeared, another coating of 3 or 4 inches is added and treated like the first, and finally a third. The object aimed at in this and all other roads is to obtain the smoothest and hardest surface. The importance of this is shown by the following results of experiments made to determine the force of traction exerted upon different roads to move forward the same wagon and load, altogether weighing 21 cwt., given by Parnell in his "Treatise on Roads":

Kind of road.	Resistance to draught.	Proportion to load.	Proportional load for horse.
Gravel laid on earth .....	147 lbs.	$\frac{1}{16}$	1
Broken stone road .....	65 "	$\frac{1}{56}$	2
Do. on paved foundation ..	46 "	$\frac{1}{81}$	3
Well made pavement .....	33 "	$\frac{1}{11}$	$4\frac{1}{2}$
Best stone trackways .....	12 $\frac{1}{2}$ "	$\frac{1}{79}$	11
Best form of railroad .....	8 "	$\frac{1}{260}$	18

—The broken stone roads are made either upon prepared earth road surface, which is first thoroughly drained, or upon a paved foundation. The former is the plan of Macadam, who was the first in England to make roads of angular fragments of stone, and the latter is the plan of Mr. Telford, who constructed the great road already referred to between Holyhead and Shrewsbury. Each system has had strong advocates, and the best roads in use are formed after one or the other plan. The stones employed by Macadam are hard and tough varieties, such as are not readily pulverized by the wear of wheels. Basalt and other rocks containing hornblende furnish the best sorts. Hard-burned bricks or balls of clay, specially prepared, answer a good purpose, and also the cinders of iron furnaces. The rough materials are brought to the line of the road and deposited along the side, where they are broken by hand hammers, the workmen sitting down and placing each large fragment upon a block before them to receive the blow of the hammer. It is recommended to furnish each laborer with a gauge, made of an iron ring  $2\frac{1}{4}$  inches in diameter inserted in a handle, and to require that each fragment should pass through it. The largest of these should weigh about 6 oz., and in some instances this weight has been made the test. Some authorities recommend 2 inches and others  $1\frac{1}{2}$  as preferable to larger sizes.

The smaller the fragments the quicker the road becomes hard in use; but to produce a perfectly consolidated bed, the average pieces must not be much below the sizes named. Macadam rejected all the splinters and finer fragments, but the French engineers prefer to have these intermixed. The road sooner becomes settled with them; but it is objected that they absorb and retain water in the lower portions of the covering, and this freezing and thawing breaks up the crust, while without the fine materials these portions find a firm bearing among themselves. It would seem, however, that the fine dust made by the surface wear must find its way into the interstices below, and that this is necessary to produce the water-tight flooring which is one of the prime objects of the broken stone covering. The application of the stones upon the well drained bed is first made in a layer 8 inches deep of clean fragments, spread in dry weather, and left to become nearly consolidated by travel, attention in the mean time being directed to filling the ruts as they are produced. When worn nearly smooth, another layer of the same thickness is to be added, and this should be done in wet weather or with the application at the same time of water, as the two beds will then better unite. When this is properly worn, a third coat should be added; and for roads of heavy travel a fourth may be required. By this method a solid crust is obtained in the shortest time and with the least wearing down of the material; while if the whole thickness of 9 or 12 inches were put on at once, the stones by their movement among themselves would be worn into spherical shapes, and be gradually reduced to powder without binding together to form a solid bed. Very heavy rollers may be advantageously used to hasten the consolidation, and clean gravel to a limited extent may be added to the surface of the broken stone covering and rolled in. This should be done after a shower or with the application of water, but at a season when the road itself must be dry. From the middle portion the road is made with a gentle slope to each side, just sufficient to shed the water that falls without allowing it to form swift currents. The most perfect roads are furnished with a shallow drain each side, and outside of these are raised foot paths, beyond which are the main drains for the road, reaching considerably below its level, and receiving under the foot paths the drainage of the road itself. These conditions however vary in different circumstances; a road, for instance, passing along the side of a steep hill is well made to slope toward the hill, and the ditch to pass along that side, an occasional sluiceway leading under the road to discharge the waters down the declivity. A ditch should also be made in the hillside above the level of the road, to turn the water that would otherwise wash down upon it. The road once completed is kept in order only by continual care. The dust formed by the wearing action

of the wheels and of the horses' feet should be constantly swept off, and wherever ruts and depressions appear they should be at once removed by filling in fresh stones after a rain, and these should never be put on at once to a greater depth than the thickness of a single stone; when worn so as to have united with the rest, more may be added. When a road is thoroughly made and well drained, it is estimated that the labor of one man is required on every 3 miles for the first 2 years, and on every 4 miles for the next 2 years, to keep it in order, by spreading loose stones in the hollows, raking them from the middle, opening the ditches, &c. The 5th year it may be necessary to make repairs by restoring to the road its original surface outline, raising the middle and cutting down the sides; and to make the new material unite with the old, the surface may be slightly broken up or lifted with short picks.—Telford's road differs from Macadam's chiefly in the foundation. A level bed is first prepared, and upon this is laid a firm pavement of stones, set on edge lengthwise across the road. The stones are not to exceed across their upper or narrowest edge a width of 4 inches. In the middle of the road they should be 7 inches deep; at 9 feet from the centre the depth should be 5 inches; at 12 feet, 4 inches; and at 15 feet, 3 inches. The upper surface should be dressed with hammers, and all the depressions be filled with stone chips firmly wedged in by hand with the hammer. When finished, a comparatively smooth convex surface is presented, about 4 inches higher in the middle than at the edges of the road. The middle portion of the pavement, 18 feet wide, is then covered to a depth of 4 inches with broken stones not more than 2½ inches in diameter, and as nearly cubical in form as practicable; and after this coating has been consolidated by travel, attention being all the time directed to keeping the surface smooth and preventing the formation of ruts, another layer of 2 inches of stone is added. The paved spaces on each side are to be covered with broken stones or well cleansed strong gravel, to such a depth that the road shall be 6 inches higher in the middle than at the edges. The whole of the materials should then be covered with a binding of 1½ inches in depth of good gravel, free from clay or earth. While such roads are best adapted for country highways, they are not so well suited for the thoroughfares of large towns, on account of the dust they generate under incessant travel, and the frequent repairs they would there require. Paved roads answer best for cities. (See PAVEMENT.)—Plank roads were in high repute for a time, between the years 1840 and 1850, in the United States. They were formed by spiking 8-inch hemlock and other cheap planks down to longitudinal sleepers, which were imbedded in the earth road. When new they made an excellent smooth floor, over which horses could draw very heavy loads; but they proved trou-

blesome and expensive to keep in repair, and their use was soon generally abandoned.—Among the most important works relating to roads are Macadam's "System of Roadmaking" (London, 1825); Parnell's "Treatise on Roads" (London, 1838); Telford's reports to parliament on the Holyhead road (London); Penfold "On Making and Repairing Roads" (London, 1835); Poncelet, *Mécanique industrielle* (Paris, 1841); Morin, *Aide-mémoire de mécanique* (Paris, 1843); Gayffier, *Manuel des ponts et chaussées* (Paris, 1844); Gillespie, "Manual of the Principles and Practice of Roadmaking" (8th ed., New York, 1853).

ROAD RUNNER, a translation of the Spanish name (*correcamino*), commonly applied to a large terrestrial bird of the cuckoo family, and genus *geococcyx* (Wagler). The bill is long, strong, slightly compressed, and curved at the tip; the head has an erectile crest; on the lores and at base of bill the feathers are stiff and bristly; nostrils long and linear; naked colored skin around and behind eyes; lids ciliated; wings very short and concave, the tertials as long as the primaries; tarsi very stout and longer than toes; tail longer than head and body, of 10 narrow, much graduated feathers. The genus occurs in Texas, Mexico, and California, and numbers 2 species, of which the one found within the limits of the United States is the *G. Californianus* (Wagl.), the *hoitlalotl* of the Mexicans, the *paisano* (countryman) of the Spanish, and chaparral cock of the miners. It is from 20 to 24 inches long, with an alar extent of 20, and a bill of nearly 2 inches; the general color above is dull metallic olivaceous green, each feather broadly edged with white near the end, with a blackish tinge on the neck; on the sides and under surface of neck the white feathers have a central black streak; the under parts are pure white; primaries tipped with white; central tail feathers olive brown, the rest dark green edged and tipped with white; top of head blackish blue. It is called road runner from its frequenting the highways, along which it runs faster than the fleetest horse; as the outer hind toe is reversible and very flexible, it can be equally well adapted for perching or climbing and for running; when it is directed backward, the bird proceeds by irregular but vigorous hops, and when forward by a smooth running pace. It is a very shy bird, living chiefly upon the ground, but able to spring up 8 or 10 feet very suddenly in pursuit of food, and when alarmed flying with a light and quick motion for about 100 yards when it cannot run into some protecting thorny chaparral; it is usually seen in shady, bushy, and solitary places. The food consists of insects, especially grasshoppers and beetles, snails, lizards, and small mammals; it is tamed by the Mexicans, and kept about their houses to rid them of vermin, vertebrate and invertebrate. It digs with the bill and scratches with the feet, and seems to form one of the connecting



links between scansorial and rasorial birds. The nest is placed on or near the ground; and the eggs are 3 and whitish. The natives of California believe that this bird collects the cacti armed with barbed and sharp spines, and forms with them a circle around any serpents it may find asleep or basking in the sun, and that the reptile, unable to escape, dies from the effects of its own bite or pierced by the sharp spines. The *G. affinis* (Hartl.), from Mexico, is a smaller and lighter colored species. These birds, though hardly ever used for food, are often chased on fleet horses, affording great sport in an open country, but are rarely overtaken.

ROANE. I. A new N. W. co. of Va., intersected by branches of the Kanawha and De Kalb rivers; pop. in 1860, 5,809, of whom 72 were slaves. The surface is generally hilly, and in the N. part mountainous, and the soil productive. Iron ore and coal are found. Capital, California. II. An E. co. of Tenn., intersected by the Tennessee river and drained by its branches, the Clinch and Holston; area, about 600 sq. m.; pop. in 1860, 11,735, of whom 1,748 were slaves. Along the W. border there is a range of the Cumberland mountains. The soil is generally fertile. The productions in 1850 were 595,296 bushels of Indian corn, 137,440 of oats, 20,026 of wheat, 37,149 of sweet potatoes, 15,121 lbs. of tobacco, and 137,519 of butter. There were 2 grist mills, 8 tanneries, 37 churches, and 4,182 pupils attending public schools. Capital, Kingston.

ROANOKE, a river formed at Clarksville, Mecklenburg co., Va., a short distance N. of North Carolina, by the junction of the Dan and Staunton. It flows E. S. E., entering North Carolina, and at Weldon, the head of steamboat navigation, it meets tide water. There are falls here which prevent further ascent for the larger vessels, but small boats by means of a canal can proceed some distance up both the Dan and Staunton. From Weldon it holds a S. E. course for about 150 m., when it enters Albemarle sound at the mouth of Chowan river. Its length from the junction is about 260 m., but including either the Dan or Staunton it would be nearly 500. It has a rapid current, and is obstructed in its early course by falls and rapids.

ROANOKE, a S. co. of Va., intersected by Staunton river, bordered S. E. by the Blue ridge, and N. W. by a ridge of the Alleghanies; area, about 200 sq. m.; pop. in 1860, 8,048, of whom 2,643 were slaves. It occupies part of the great Virginia valley, and has a very fertile soil. The productions in 1850 were 235,760 bushels of Indian corn, 104,134 of wheat, 103,643 of oats, 362,682 lbs. of tobacco, and 18,289 of wool. The value of real estate in 1856 was \$2,958,564, showing an increase of 67 per cent. since 1850. It is intersected by the Virginia and Tennessee railroad, which passes through the capital, Salem.

ROB ROY (literally, Robert the Red), a Scottish freebooter, born about 1660, died in

1743. His true name was Robert Macgregor, which, after the outlawry of the clan Macgregor by the Scottish parliament in 1693, he changed for that of his mother, Campbell. Previous to the rebellion of 1715 he was a dealer in cattle; but having joined the pretender he gave his enemy, the duke of Montrose, an excuse for seizing his lands. He retaliated by a war of reprisals upon the duke. For many years he continued to levy black mail upon his enemies in spite of the presence of a British garrison near his residence at Aberfoyle. His name and exploits have survived to the present time, chiefly through the instrumentality of Sir Walter Scott, of whose novel, "Rob Roy," he is the hero.

ROBBERY, in law, a felonious taking of money or goods, of any value, from the person of another or in his presence, against his will, by violence or putting him in fear. The characteristic feature of this offence, and that which makes the distinctive difference between it and simple larceny from the person (or between a robber and a cutpurse or common thief), is the violence and fear attending its perpetration; and therefore it makes no material difference whether the thing taken be of great or small value, though it must be of some real value, for otherwise it is no larceny and consequently no robbery; and there must also be an actual taking of something, for the violence and putting in fear alone would amount only to an assault. It is not necessary that the money or property should be taken directly from the person or manual possession of the owner in order to constitute this offence. If it be taken in the actual presence of the owner, and violence be offered to his person, or he be put in fear for the purpose of accomplishing such a taking, this amounts to the same thing; as if, for instance, a robber should assault a man and command him to deliver up his purse, but instead of doing so the owner should throw it away from him, and the robber should then pick it up and carry it off in his presence, this would be as much a robbery as if he had taken it from the owner's person. But the taking, if not from the person, must be in the actual presence of the owner; for if not, it is simply larceny. The robber must also have absolute possession of the property, even though such possession continue only for a moment, in order to complete the offence; and in a case where it appeared that the prisoner stopped the prosecutor, who was carrying a feather bed on his shoulders, and ordered him to lay it down or he would shoot him; that the prosecutor laid the bed on the ground as commanded, but before the prisoner could take it up so as to remove it from the spot where it lay, he was apprehended; the judges held that the offence was not completed, for he had gained no possession of the property. So if a robber cuts the purse from the owner's girdle with the intent to steal it, and it falls to the ground, but for some reason, as by being interrupted, he does not pick

it up, or otherwise obtain possession of it, this is not sufficient to complete the offence. Yet if possession is once actually gained, it is not material that it should continue; and though for any reason the robber should return the money stolen the next moment after receiving it, either absolutely or conditionally, yet this will not alter the crime, or render its consummation less complete. A sudden snatching of a thing from the hand or person of another is not such a taking by force and through fear as will constitute robbery, unless it occasions either an injury to the party from whom it is snatched, or a struggle for the possession of the property taken; for here there is no putting in fear; and though a certain degree of force may be used, the theft is accomplished rather without than against the consent of the owner, and more by the dexterity of the thief and the sudden surprise of the party than by open force and terror. But where an ear ring was so suddenly pulled from a lady's ear that she had neither time nor opportunity for resistance, it being done with such violence that her ear was entirely torn through, the perpetrator was held guilty of robbery. So, too, where the prisoner snatched at a sword which was hanging at a gentleman's side, who seeing the thief's intention immediately laid hold of it himself, whereupon a struggle for its possession took place between the two, which ended in the robber's obtaining the sword, this was held to be robbery. The violence and putting in fear, moreover, must precede the taking. If a man quietly steals any thing from the person, though he afterward retains possession of it by violence or by intimidating the owner, this is not robbery; for the fear is subsequent to the larceny, and no violence subsequently used, even with respect to the same thing, will operate so as to convert that into robbery which was before only larceny. But if a man be knocked down without any previous warning, and then stripped of his property while senseless, though he could not properly be said to have been previously put in fear, yet it would be a robbery; for the violence used is of itself sufficient, and of that character which would have excited the liveliest apprehensions in his mind had his consciousness remained. If the violence be fraudulently used under color of some legal proceeding; or if money be forcibly extorted under pretence of a purchase or sale; or if a man begs in a menacing manner, as with a drawn sword in his hand, and receives alms from the party through the apprehensions regarding his personal safety which the appearance and actions of the beggar naturally excite in his mind; in all these cases it will still be robbery. Thus, where the prisoner forcibly took a bushel and a half of wheat worth 8s. from a woman, and compelled her to accept 13d. for it, threatening to kill her if she refused, this was held to be robbery by all the judges in England. It is not necessary that the delivery of the money or goods should be

contemporary with the violence or the immediate effect of it; as, if a robber, finding but a small sum of money about a man's person, compel him to swear under a threat of death in case of non-compliance to bring him a larger sum, which the man does, this is robbery, because the terror caused by such a menace is upon him at the time of his making the payment, and was the cause of his doing so.—The payment of money or delivery of goods by the owner, under the fear of having his property destroyed, is robbery in the receiver. And it is an important rule, that the violence is sufficient to make the crime robbery, although it consist entirely of a threat to disgrace a person. The menace of accusing one of a dreadful crime which would endanger his personal safety, or the fear of losing one's character or situation by such a charge, is equivalent to the fear of personal and immediate violence; and to extort money by such means is robbery. But the fear thus excited must not only be such as will suffice to influence or even to constrain the ordinary action of the will; but it must entirely and immediately control and overpower it, and render the party incapable through terror or confusion of resisting the demand. For this reason, in a case where the prosecutor, who was threatened with having such a charge made against him unless he complied with the prisoner's demand, did not part with his money immediately upon the threat being made to him, but on the contrary did so after the party making the threat had left him, and afforded him sufficient time in which to consider the matter, and apply for assistance if he desired so to do, and after he had consulted with a friend who was actually present when he paid the money, here it was considered that the prosecutor was not impressed with such terror as to render him incapable of resisting the demand; that there was not the continuing fear which could operate in *constantem virum* from the time when the money was demanded until it was paid; and consequently there was neither the actual nor constructive violence which was necessary to constitute the crime of robbery. Further, it is not necessary that the fear should be of violence to the party robbed. If the threat is made against a man's wife or child, or other person to whom he is bound by ties of blood or affection, and he gives money to the robber for the sake of saving such person from immediate danger or violence, this would be as much a robbery as if the violence were offered to the party himself. Neither is it necessary that the robbery should be the sole and original motive of the person making use of the violence, if the violence so used led to this result; as, where a man feloniously assaulted a woman, who, without any demand on his part to that effect, offered him money which he took, yet continued to treat her with violence, for the accomplishment of his original purpose, until interrupted by the approach of others, this was held to be a robbery, for the woman, terrified

by the prisoner's behavior, offered the money to save herself from further violence, which she would not have given voluntarily otherwise.—It was a principle of the common law that no restitution of stolen goods could be awarded upon an indictment, inasmuch as it was at the suit of the king only, and the owner could only obtain restitution by an appeal of robbery, which was the suit of the party; but this has long fallen into disuse, and subsequent statutes have remedied the defect. Formerly, when a robbery or other felony had been committed in England, a hue and cry should be raised, which was the old common law process of pursuing with horn and with voice all felons. In this hue and cry all persons, both officers and private individuals, were called upon to join; and no hue and cry was deemed sufficient unless made with both horsemen and footmen. In order that such hue and cry should be the more effectually made, the hundred was bound to answer for all robberies therein committed unless they captured the felon; and this responsibility is the foundation of the ancient action against the hundred for any loss by robbery. If the robber was taken, the hundred stood excused; but otherwise the party robbed was entitled to prosecute them by a special action on the case for damages equivalent to his loss. In order further to encourage the apprehending of robbers, certain rewards were offered to such as would bring them to justice, by various acts of parliament, one of which enacted "that such as apprehend a highwayman and prosecute him to conviction shall receive a reward of £40 from the public, to be paid to them by the sheriff, together with the horse, furniture, arms, money, and other goods taken upon the person of such robber, saving only the rights of any persons from whom the same may have been stolen."—Robbery has always been considered a crime of an aggravated nature, especially when committed with dangerous or deadly weapons, and was formerly punished with great rigor and severity. Until comparatively recent times robbery was indeed punished with death, here as well as in England, even though the amount stolen would, if unaccompanied by violence, have amounted only to petit larceny. This was the rule of the common law; but the progress of civilization, which has restricted capital punishment to a few crimes, has modified the penalty for robbery, as a general thing, to imprisonment for life, or for a term of years, according to the particular circumstances and degree of the crime.

ROBBINS, ASHER, an American statesman, born in Wethersfield, Conn., in 1757, died in Newport, R. I., Feb. 25, 1845. He was graduated at Yale college in 1782, was tutor in Rhode Island college, now Brown university, and established himself as a lawyer in Newport, R. I. He became eminent in his profession, and between 1825 and 1839 was one of the U. S. senators from Rhode Island. He was an impressive speaker and an accomplished classical scholar.

ROBERT, LÉOPOLD, a French painter, born in La Chaux-de-Fond, in the canton of Neuchâtel, Switzerland, May 18, 1794, died by his own hand in Venice, March 20, 1835. After studying under David, he proceeded at about the age of 24 to Rome, where, unaided by friends or patrons, he pursued his art with singular enthusiasm. He was a laborious and assiduous painter, rejecting picture after picture which seemed to him unequal to the subject, and occupying in some instances years upon a single work. His productions are necessarily few, but in their particular department, the delineation of Italian life, are unrivalled in modern art. His masterpieces are the "Reapers," exhibited in Paris in 1831, and now in the Louvre, the "Neapolitan Improvisatore," the "Madonna dell' Arco," and the "Fishermen of the Adriatic." In the latter part of his life he conceived a romantic but hopeless passion for a beautiful woman of rank, under the influence of which he committed suicide by cutting his throat.

ROBERTS, DAVID, a British artist, born in Stockbridge, near Edinburgh, Oct. 24, 1796. In early life he was a house painter, and upon removing to London in 1821 he devoted himself for several years to scene painting. In 1832-'3 he visited Spain, and upon his return published a volume of lithographic copies of "Spanish sketches," which brought him into considerable notice. Subsequently, during a tour through Syria and Egypt and other eastern countries, he made a number of admirable drawings, lithographic facsimiles of which were published in splendid style under the title of "The Holy Land, Syria, Idumea, Arabia, Egypt, and Nubia" (4 vols. fol., 1842-'8). In 1841 he was elected a royal academician, and during the last 20 years he has produced a number of views of celebrated places, with architectural and other accessories, which are much admired. Some of them are of large size, including "Ruins of the Great Temple of Karnak," "Jerusalem from the Mount of Olives," "Rome," &c. As a painter of architectural interiors he is considered without a rival among English artists. Of late years he has painted principally the interiors of continental edifices. Occasionally he has attempted such subjects as "The Destruction of Jerusalem," of which a large colored lithograph has been published, and the "Inauguration of the Exhibition of all Nations," painted for the queen.

ROBERTSON. I. A N. co. of Tenn., bordering on Ky., bounded S. by Sycamore creek, and drained by tributaries of Cumberland river; area, about 500 sq. m.; pop. in 1860, 15,265, of whom 4,861 were slaves. It has an uneven surface and a generally fertile soil. The productions in 1860 were 858,615 bushels of Indian corn, 115,304 of oats, 86,837 of wheat, 86,655 of sweet potatoes, and 1,445,670 lbs. of tobacco. There were 5 grist mills, 9 saw mills, 7 tanneries, and 2,248 pupils attending public schools. It is intersected by the Nash-

ville and Kentucky railroad, which passes through the capital, Springfield. II. A central co. of Texas, bordered W. by the Brazos and E. by the Navasoto, and drained by their branches; area, about 900 sq. m.; pop. in 1860, 4,997, of whom 2,258 were slaves. It has a rolling surface, covered with forest and prairie, and a generally fertile soil, with some very rich bottom lands. The productions in 1850, since which its population has been greatly increased, were 41,395 bushels of Indian corn, 6,865 of sweet potatoes, 429 bales of cotton, and 18,470 lbs. of butter. Capital, Owensville.

ROBERTSON, FREDERIO WILLIAM, an English clergyman, born in London, Feb. 3, 1816, died in Brighton, Aug. 15, 1853. He studied at Edinburgh and Oxford, took orders (although his first inclination had been for the army, to which both his father and grandfather belonged, and in which he was offered a commission), and was a curate successively at Winchester, Cheltenham, and Oxford. In 1847 he became minister of Trinity chapel, Brighton, where his eloquence and originality always attracted a crowded and intellectual audience. The condition of the laboring classes deeply interested him, and he organized a working men's institute, before which he delivered several lectures. The violent denunciations of some of his sentiments by religious newspapers and persons outside of his congregation, acting on a naturally feeble constitution, hastened his death. A volume of his "Lectures on Literary and Social Topics," and 4 volumes of his sermons (12mo.), have been posthumously published at intervals, the earlier of which have already passed through numerous editions in England and America.

ROBERTSON, WILLIAM, a Scottish historian, born at Borthwick, Edinburghshire, Sept. 19, 1721, died at Grange house, near Edinburgh, June 11, 1793. His father was a clergyman, and the son was graduated at the university of Edinburgh. When 20 years old he was licensed to preach, and in 1743 was presented to the living of Gladsmuir in Haddingtonshire. In 1745 he volunteered to serve in the army against the forces of the pretender. He early became a man of marked influence in the general assembly of the church of Scotland, and was one of the leading advocates of lay patronage, which at that time was the great dividing question. In 1755 the only sermon of his ever published came out under the title of "The Situation of the World at the Time of Christ's Appearance, and its Connection with the Success of his Religion, Considered." In 1757 Robertson appeared as the defender of Home, who was persecuted by the ultra Calvinist party for having written the tragedy of "Douglas," and also of the various clergymen who had attended the theatre to witness its representation. He had for some time applied himself to historical studies, and in 1759 published his "History of Scotland during the Reigns of Mary and James VI., with a Review of the

Scottish History previous to that Period, and an Appendix containing Original Papers" (2 vols. 4to.). This work gained him the friendship of many eminent men, including Hume and Horace Walpole. He was now made chaplain of the garrison at Stirling, in 1761 a dean of the chapel royal, in 1762 principal of the university of Edinburgh and minister of the old Greyfriars, and in 1764 historiographer of Scotland with a salary of £200. About this time he entertained the project of writing the history of England; but after the resignation of Lord Bute, who had been his friend, he gave it up. In 1769 appeared "The History of the Reign of the Emperor Charles V., with a View of the Progress of Society from the Subversion of the Roman Empire to the Beginning of the Sixteenth Century" (3 vols. 4to.), which became very popular, and was translated into several languages. In 1777 the "History of America" (2 vols. 4to.) was published. He afterward advocated the repeal of some of the penal laws against Catholics, which, though abolished in England, still existed in Scotland; and in the riots which ensued in Glasgow and Edinburgh, an attack upon his house was threatened. He now retired from public life, but Major Rennel's "Memoirs of a Map of Hindostan" led him into a train of inquiry, the fruits of which were given to the public in 1791 in a work entitled "An Historical Disquisition concerning the Knowledge which the Ancients had of India, and the Progress of Trade with that Country prior to the Discovery of the Cape of Good Hope" (4to.). The life of Dr. Robertson was written by Dugald Stewart.

ROBERVAL, GILLES PERSONE or PERSONIER DE, a French geometer, born in 1602 in a village of Beauvaisis from which he took his surname, died in 1675. Repairing to Paris in 1627, he was 4 years later appointed professor of philosophy in the college of Maître Gervais, and in 1632 held the chair of mathematics in the college of France. A bold and original thinker, he devised methods by which problems then considered difficult were solved with comparative ease, and partly anticipated the discovery of the fluxionary or differential calculus. He was one of the original members of the academy of sciences established by Colbert in 1666. He figured as one of the opponents of Descartes, and proved himself a violent and unfair adversary.

ROBESON, a S. co. of N. C., bordering on S. C., watered by the Lumber and Little Pedee rivers; area, about 900 sq. m.; pop. in 1860, 15,490, of whom 5,456 were slaves. It has a nearly level surface and a generally sandy soil. The productions in 1850 were 327,257 bushels of Indian corn, 1,562 of wheat, and 2,299 bales of cotton. There were 2 saw mills, 7 tar and turpentine manufactories, 1 woollen factory, 17 churches, and 1,415 pupils attending public schools. Capital, Lumberton.

ROBESPIERRE, FRANÇOIS JOSEPH MAXIMILIEN ISIDORE, a French revolutionist, born in Arras in 1758, executed in Paris, July 28,

1794. His father was an advocate, and president of a Jacobite club founded by Charles Edward the pretender. His mother died young, leaving him the eldest of 4 children, who by the desertion of the father were left without protection or support. Little is known of his early youth. Stories of his ferocious disposition as a boy appear to be without foundation. His excellent standing at the college of Arras ingratiated him with the bishop, who sent him to Paris in 1770 to continue his studies at the college of Louis le Grand. Danton, Desmoulins, and Fréron the younger were among his fellow pupils. He was a close student, and repeatedly gained honorable distinction in his studies. He remained at this institution 8 years, and then studied law. A poor youth resident in Paris, of humble birth and high culture, imbued with the principles of Rousseau, and given to study and thought, he observed with disgust the pretensions of a frivolous aristocracy, and gave to the humbler classes all his sympathies. After completing his law studies he returned to Arras, where he gradually won his way to a high standing in his profession. It is curious to note that his first important cause was a defence of the introduction of Franklin's lightning rods against the charge of impiety (1783). He became a member of the criminal court of Arras, and in the discharge of his duties was called to condemn a prisoner to death. This so affected him that he resigned his office, and advocated the abolition of capital punishment. He now gradually came to espouse the cause of the people in opposition to the clergy. On the convocation of the states-general in 1789, he appeared as deputy of the third estate of Artois. Lamartine describes his figure as slight; limbs feeble and angular; voice shrill and monotonous; forehead small and projecting over the temples; eyes of a blue color and deeply set; nose straight and small, and very wide at the nostrils; mouth large and lips thin; chin small and pointed; complexion yellow and livid, like that of an invalid or a man worn out by vigils and meditation. There was a prodigious and continual tension of all the muscles of his face. His countenance was habitually severe, and wore a smile wavering between sarcasm and sweetness. In the states-general he strenuously opposed the giving the king a suspensive veto power, resisted the decrees of martial law, pleaded for the remission of sundry disabilities against the Jews and comedians, and advocated the abolition of the compulsory celibacy of priests. After the adoption of the declaration of the rights of man, he was continually recalling the assembly to the principles of that formula. On June 19, 1790, the assembly elected him one of its secretaries. His means were slender, having nothing beyond his pay as deputy, 18 francs a day, of which he sent one fourth to his sister for her support. He occupied a retired and ill furnished lodging, and Michelet describes him as entering the tribune dressed in a threadbare olive-

green coat, his only one. After Mirabeau's death, Robespierre rose to a more commanding position. He was studious and abstemious, and constant in attendance at the Jacobin club and the assembly. He at length began to be feared. Duport and Bigot, who had been named president and vice-president of the criminal tribunal, with Robespierre for public accuser, refused to serve on account of his extreme views. This office he held from June, 1791, till April, 1792. He thought that "in general there is nothing so just nor so good as the people, when not irritated by the excesses of despotism." He still advocated the abolition of capital punishment, and the admission of all citizens into the national guards and upon juries. He claimed for the blacks in the colonies a participation in political rights, and exclaimed: "Let the colonies perish rather than a principle." He was one of the leaders of the mob in the riot of July 14 and 17, intended to overawe the assembly and drive it into accepting the abdication of the king, and showed himself a coward on this occasion. At the close of the constituent assembly, Sept. 30, 1791, the people of Paris received him with rapture. By a decree of the assembly, proposed by Robespierre, no member was eligible to the next legislature, which convened on the dissolution of its predecessor. He took advantage of the occasion to revisit his native town, where he was welcomed with an ovation. After 7 weeks' rest he returned to Paris, and during the sitting of the new assembly we find him in constant attendance upon the meetings of the Jacobin club. When the assembly voted a sum for martial preparations, he alone opposed the measure. He began in the spring of 1792 a journal entitled *Le défenseur de la constitution*, which closed with the 12th number. In the conspiracy which culminated in the massacres of Aug. 10 he does not appear to have participated, though he afterward spoke of that day as one of the most glorious in the annals of the world. He was made one of the new municipality following this insurrection, and a day or two afterward appeared before the assembly as the spokesman of a deputation from the commune to demand the establishment of a new criminal court for the summary trial of the enemies of liberty. This court, afterward remodelled as the revolutionary tribunal, was promptly organized, and Robespierre was named for presiding judge; but he declined on the ground that it was not just for him to be judge of those whom he had already denounced as enemies of the country. He remonstrated with Danton against the frightful massacres in the prisons on Sept. 2 and 3; and after that he ceased to appear at the commune. He was a member of the national convention, having been elected to represent Paris. On Oct. 29 Louvet denounced him before the convention as aspiring to the dictatorship; but he defended himself triumphantly. To give greater publicity to his views, he published every Friday a news-

paper, entitled "Letters to my Constituents." He led the Jacobins in the condemnation of the king and in demanding his death. After that event he proposed the decree establishing the revolutionary tribunal, clothed with executive powers above the convention. He was not however made a member of it until July 26 following, though on March 26 he was elected a member of what was called the committee of general security, which was only an auxiliary of the committee of public safety. There is much confusion on this point among authorities, and Robespierre has been held up to obloquy for crimes committed by the executive tribunal at a time when he was not a member of it. His first great act as a member of this committee was the institution of the reign of terror. The condemnation of the Girondists he defended by saying that "there are periods in revolutions when to live is a crime." The feast of reason, decreed by the convention, disgusted him as the degradation of the revolution. In opposition to Hébert and his adherents, he seems to have sincerely wished the reign of peace and justice, and thereby incurred from them the accusation of moderation, while he was at the same time preaching terror as the necessary instrument of the revolution. In the committee he appears to have been in decided antagonism to the majority. His official signature is affixed to but few sentences of death. Still there belongs to him no small share of infamy in that he refrained from raising his voice where it might have availed against the slaughter of innocent persons. He sacrificed Hébert to make himself master of the commune, and Danton to make himself master of the convention; while at the Jacobin club his supremacy had long been undisputed. All eyes were now riveted upon him. His commanding influence was signalized by the extraordinary spectacle of June 8, the festival of the Supreme Being, which he had caused to be decreed, and in which he was the principal actor. But he lacked the courage as well as the genius to organize a dictatorship. Indeed, he himself appreciated his defects, or pretended to. "I was not made to rule," he said; "I was made to combat the enemies of the people." He caused to be decreed a committee of justice to revise arrests, and guard against the sacrifice of innocent persons; but his colleagues resisted, and the scheme failed. On June 10 he proposed the law for the reorganization of the revolutionary tribunal, his object being to rid the nation of the great culprits in the convention. But his purpose was seen through, and he was driven to disclaim it. The convention now became alarmed for its own safety. Being unable to control the committees, he withdrew from them and sought to overthrow them. The wholesale butcheries which followed were perpetrated without his connivance, though, being the author of the decree itself, he is to be held responsible for the atrocities it per-

mitted. For the last 6 weeks of his life he had no voice in the government. In his speech in the convention on July 26 he asked if in that interval "faction had been less audacious, or the country been happier." A tumult followed the speech, and the convention refused to publish it. This was equivalent to his overthrow. He returned to the Jacobins, and announced himself doomed. They rallied round him, and besought him to head an insurrection against the convention. This he refused to do, and on the following day he reappeared in the convention, where his arrest was decreed. The commune instantly organized an insurrection and rescued him; but he would give no countenance to the riot. "The death of one man," said he, "is less hurtful to the republic than the example of revolt against the national convention." The insurrectionists were soon overpowered, and at the hôtel de ville Robespierre was seized. At this time he is said to have been wounded in the face by a shot from one of the soldiers, which gave rise to the statement that he made an attempt on his own life; but the fact is uncertain. The form of trial was quickly enacted, and early in the evening of July 28 the guillotine terminated his existence.

ROBIN, a name applied in the old world to several small denti-rostral birds of the family of warblers, and sub-family *erythacina*. In these the bill is short, slender, tapering, depressed at the base, slightly curved and notched at the tip, and the gape and basal portion of the nasal groove covered with bristles; the tarsi are long and slender, covered in front with an entire scale, occasionally showing marks of division; the toes are moderate, the hind one and claw usually the largest, and the claws curved and sharp; tail usually short and broad, and wings moderate and rounded. Gray mentions 15 genera, most of which are inhabitants of the eastern hemisphere, over which they are very generally distributed; they feed on worms, insects, seeds, and fruits, which they seek on the ground or in trees, and when hard pressed approach familiarly human habitations; the nests are large and carefully lined with soft materials, and the eggs generally pale blue. The only genus that can be mentioned here is *erythacus* (Ouv.), and the single species the robin redbreast (*E. rubecula*, Ouv.), well known to every English school boy, and endeared to European nations, especially Great Britain, by its confiding and cheerful disposition. It is about 5½ inches long, with an alar extent of 9 inches; the prevailing color above is olive green; the forehead, cheeks, fore neck and part of breast, light yellowish red. It is a permanent resident in temperate Europe, Asia Minor, and N. Africa; it is the most familiar of the small birds, boldly approaching the dwellings of man, and in winter so fearless as to enter houses and pick up crumbs from the floor or the table; its sprightly movements, knowing look, bright eyes, sweet notes, and pleasing plumage, render it always a welcome

visitor. The song is sweetly modulated, plaintive, and not loud, heard through spring, summer, and autumn, and even in dull and rainy weather when most other song birds are silent; it is one of the latest birds to retire at night, and one of the earliest in the morning; it is solitary, never congregating in flocks; the food consists of worms (which it beats to death and cleanses before eating), insects, and their larvæ. Generally, and especially in the breeding season, it is very pugnacious, driving off all small birds coming near its favorite resorts, and attacking even cats and large birds. The nest is often made in out buildings which are daily used, and sometimes in situations where there is great confusion and noise; it is made of moss, leaves, and grasses, lined with hair and feathers; the eggs are 5 or 6, white, with pale reddish brown spots.—Birds of very different families in various parts of the world bear this name, as is the case with our American robin, which is one of the thrushes, *turdus migratorius* (Linn.); the generic characters are given under THRUSH. It is unnecessary to describe this well known bird, which is nearly twice the size of the European robin, any further than to say that the general color above is olive gray, with the top and sides of the head black, chin and throat white, black-streaked, and the under parts chestnut brown; there is considerable variation in the plumage, which is more or less marked with white, even to albinism. It is distributed over North America, as far as Mexico on the west and to lat. 60° N., breeding over most of this extent. This is one of the first birds seen in the spring, a few in sheltered places remaining all winter as far north as New England, and many arriving there from the south before the snow has disappeared; most however migrate during winter to the southern states, where they are very common, occurring in flocks and killed in immense numbers. The song is simple but pleasing and lively, though not to be compared to that of many other thrushes; it much resembles that of the European blackbird (*T. merula*, Linn.). Much of the regard in which the robin is held here is derived from that accorded to the English robin, which ours resembles in its red breast, familiar disposition, and cheerful notes; it is generally protected, except during the shooting season in the southern and middle states, where it is slaughtered indiscriminately; in Massachusetts the laws forbid its destruction at any time of year. The nest is often built near houses and in very noisy locations; a robin has been known to build on the timbers of a railroad bridge over a wide sheet of water, on which trains passed at least every hour during the day and night—not only a dangerous and a tremulous position, but one from which it must be difficult to teach the young to fly, as a misstep would precipitate them into the water. The eggs are 4 to 6, bluish green and unspotted; they are rarely molested; two broods are raised in a season, even in New England.

the parents are very anxious in regard to the young, uttering a shrill and plaintive cry when the nest is approached; they sometimes breed year after year on the same spot. The flight is rapid, and at times high and long sustained. From its gentle and docile disposition, lively movements, and pleasing song, it is often kept as a cage bird; it is fed on bread soaked in milk or water, fruits, and insects; it is long-lived in captivity, but liable to suffer and die during moulting. The flesh is tender, savory, and easily digested, and a favorite article of food in the middle and southern states, where the markets in the shooting season are glutted with them.—The golden robin has been described under BALTIMORE ORIOLE.

ROBIN HOOD. See HOOD, ROBIN.

ROBINS, BENJAMIN, an English mathematician, born in Bath in 1707, died in Madras, July 29, 1751. His parents were Quakers, and were too poor to give him any but the simplest education. As a means of furthering his studies he established himself in London as a private teacher in 1725, and became known to men of science as one of the most accurate mathematicians of the time. Fortification and gunnery became a favorite study with him; he made several excursions to Flanders to examine the constructions of the best engineers, and a series of experiments to determine the value of the explosive force of gunpowder, and the effect of the heat and moisture of the atmosphere on that force and the resistance of the air to projectiles. He was engaged in various mathematical controversies, opposed Bernoulli upon the relative proportions of forces and velocities, and answered in defence of Sir Isaac Newton's method of fluxions some criticisms of Bishop Berkeley. In 1750 he was made engineer in general to the East India company, and proceeded to Madras, where he was soon after attacked with the fever that finally caused his death.

ROBINSON, EDWARD, an American philologist and biblical scholar, born at Southington, Conn., April 10, 1794. He was graduated at Hamilton college, Clinton, N. Y., in 1816, and served for a year as tutor in the college. He married a daughter of the Rev. S. Kirkland, missionary to the Oneida Indians; but she dying in 1819, he continued at Clinton prosecuting his studies till 1821, when he went to Andover, Mass., to procure the printing of an edition of the first 6 books of the Iliad, which he had edited. While residing at Andover he commenced the study of Hebrew, and was employed by Prof. Stuart to correct the proofs of his Hebrew grammar, which led to their undertaking together some translations of text books from the German, to his being left in charge of Prof. Stuart's class in his absence, and finally to his appointment as assistant instructor. He remained at Andover till 1826, when he sailed for Europe, and spent the next 4 years in travel and study, during which he married Miss Theresa A. L. von Jakob, daughter of Prof. von Jakob of Halle. In 1830 he returned



to Andover, and received the appointment of professor extraordinary of sacred literature, and librarian, which he resigned in 1833, and removed to Boston. In 1837 he was appointed professor of biblical literature in the Union theological seminary in the city of New York, which position he still occupies. Before assuming its duties, he visited Palestine, of which, in company with the Rev. Dr. Eli Smith, he made a minute and careful survey. At Berlin he embodied the results in the form of a narrative, which was published simultaneously in Germany, England, and America ("Biblical Researches in Palestine, and in the Adjacent Countries, a Journal of Travels in the Year 1838," 3 vols. 8vo., Halle, London, and Boston, 1841). He entered upon the duties of his professorship in 1840, in which, and in philological and geographical studies, he has since passed most of his time. In 1852 he again visited Palestine, investigated with Dr. Smith some topics previously passed over, and published the results of this tour in 1856 (1 vol. 8vo.) in connection with a revision of his previous researches. He is understood to be now engaged in the preparation of a physical and historical geography of the Holy Land. Dr. Robinson has been for several years an active and efficient member of the American geographical, oriental, and ethnological societies. He received the degree of D.D. from Dartmouth college in 1831 and from the university of Halle in 1842, and that of LL.D. from Yale college in 1844. Dr. Robinson has published a translation of Buttmann's Greek grammar (Andover, 1832; new translation from the 18th German ed., New York, 1850); "A Greek and English Lexicon of the New Testament" (Boston, 1836; new ed., entirely rewritten, New York, 1850); "The Harmony of the Four Gospels," in Greek (Boston, 1845), and in English (1846). He edited from 1831 to 1834 the "Biblical Repository," a theological quarterly, subsequently united with the "Bibliotheca Sacra," which he established and edited for one year in New York. He has also edited Calmet's "Biblical Dictionary" and other works, and published 4 revisions of his translation of Gesenius's Hebrew lexicon, the last in 1854.—**THERÈSE ALBERTINE LOUISE**, known as an author under the name of **TALVI**, wife of the preceding, born in Halle, Germany, Jan. 26, 1797. In 1807 she accompanied her father to Russia, where he became professor in the university of Kharkov. Here she began the study of the Slavic languages and literature, and also wrote her first poems. Her father being transferred to St. Petersburg in 1810, she spent her time there principally in the acquisition of modern languages and the study of history. In 1816 she returned to Halle, and applied herself to the study of the Latin language, but resisted numerous entreaties to allow her productions to appear in print. She however wrote a few tales, which were published at Halle in 1825 under the title of "Psyche," and others appeared in almanacs under the signature of

"Talvi," formed from the initial letters of her maiden name. In 1822, under the signature of Ernst Berthold, she made a translation of Walter Scott's "Old Mortality" and "The Black Dwarf." About this time a collection of Servian popular songs fell into her hands, and she began the study of Servian, and translated a number of poems from that language, which were published under the title of *Volkslieder der Serben* (2 vols., Halle, 1825-'6). In 1828 she was married to Prof. Robinson, and accompanied him in 1830 to America. Here she turned her attention to the aboriginal languages, and translated into German Mr. John Pickering's work on the Indian tongues of North America (Leipsic, 1834). In 1834 she wrote for the "Biblical Repository" a "Historical View of the Slavic Languages," which in 1850, after being revised and partly rewritten, was published at New York in a 12mo. volume entitled "Historical View of the Languages and Literature of the Slavic Nations, with a Sketch of their Popular Poetry." In 1837 she returned with her husband to Germany, where she remained until 1840, and there published a treatise entitled "An Essay on the Historical Characteristics of the Popular Songs of the Germanic Nations, with a Review of the Songs of the Non-European Races" (Leipsic, 1840). In the same year also appeared a small work under the title of "The Poems of Ossian not Genuine." After her return to New York she wrote "A History of Capt. John Smith" in German, published in F. Raumer's *Historisches Taschenbuch*. This was followed by "The Colonization of New England" (Leipsic, 1847), of which work the younger Hazlitt made a translation into English. Beside the works already spoken of, she has written "Heloise, or the Unrevealed Secret" (New York, 1850), "Life's Discipline, a Tale of the Annals of Hungary" (1851), and "The Exiles" (1853), afterward published as "Woodhill, or the Ways of Providence;" and she contributes to various American and German periodicals.

**ROBINSON, JOHN**, an English dissenting clergyman, born in 1575, died in Leyden, March 1, 1625. He was educated at Cambridge, and held for a time a benefice near Yarmouth in Norfolk, but was subsequently chosen pastor of a dissenting congregation formed in 1602 in the north of England. This church was "beset and watched night and day by the agents of the prelacy," and in 1607 its members attempted to leave England for Holland, but were prevented by the civil officers, who kept the whole company under arrest for a month. The design was renewed in 1608, and successfully carried out. They arrived in Amsterdam, remained there about a year, and then by the advice of their pastor removed to Leyden. Here they remained 11 years in friendly intercourse with their neighbors, and their numbers were so largely increased by arrivals from England that they became a great congregation. Here, too, Robinson, in a controversy on free will, "began

to be terrible to the Arminians." In 1613 Episcopius, the successor of Arminius, and professor in the university of Leyden, declared his willingness to defend the doctrines of Arminius against all opposers, and Robinson accepted the challenge. A public disputation was held in the presence of a large assembly, and the friends of the latter assert that "the truth had a famous victory." In 1617 another removal was contemplated, and Robinson with his whole heart went into the plan of forming a settlement in America. Having succeeded in the negotiations, a minority of the congregation under the lead of Brewster, the ruling elder, set out in 1620 in two ships, the *Speedwell* and the *Mayflower*, which could hold only a small number. It was the intention of Robinson to follow with the rest of the congregation, but he died before the consent of the association of English merchants who controlled the enterprise could be obtained. The remainder of his church and his widow and children emigrated not long after his death. He was an acute controversialist, and highly versed in classical learning. He published "A Justification of Separation from the Church of England" (1610); "Of Religious Communion" (1614); *Apologia Justa et Necessaria* (1619), which in 1644 was translated into English; "A Defence of the Doctrine propounded by the Synod of Dort" (1624); "A Treatise of the Lawfulness of Learning of the Ministers in the Church of England" (1634); and "Essays or Observations, Divine and Moral" (1628). His complete works were published at Boston in 1851 by the Congregational board of publication, in 3 vols.

ROBINSON, ROBERT, an English dissenting minister, born at Swaffham, Norfolk, Jan. 8, 1735, died in Birmingham, June 9, 1790. At the age of 14 he was apprenticed to a London hairdresser, became a follower of George Whitefield, and began to qualify himself for a preacher at the age of 19. He finally became pastor of an Independent church at Norwich, in 1761 settled at Cambridge as pastor of a Baptist congregation, and in 1773 added to his clerical functions the calling of a farmer and dealer in coal and corn. In 1784 offers were made to him of preferment in the established church, which he declined. His intense application to study for a projected history of the Baptists is thought to have shortened his life. Some time before his death he became a Unitarian and an admirer of Dr. Priestley. He left various theological works.

ROBINSON, JOHN, a Scottish writer on natural philosophy, born near Glasgow in 1739, died in Edinburgh, Jan. 30, 1805. He was graduated in 1756 at the university of Glasgow, and in 1758 went to London and became private tutor to the son of Admiral Knowles, and entered as midshipman on board the *Royal William*, his pupil being lieutenant. This vessel was one of the fleet intended to act with Gen. Wolfe in the siege of Quebec, and arrived off the American coast in April, 1759. Sailing up

the *St. Lawrence*, he was employed in making surveys. After 2 years' service on board the *Royal William*, he accompanied Knowles, who had been appointed to the sloop of war *Peregrine*, 20 guns, on a voyage to Spain and Portugal, but after 6 months left the naval service. By the recommendation of Admiral Knowles, he was sent on a trip to Jamaica with a son of John Harrison to take charge of his chronometer, sent out to be tested. In April, 1763, he returned, but failing to get any promotion from the board of admiralty, he again resumed his studies at the university of Glasgow, and on the recommendation of Dr. Black succeeded him in 1766 as lecturer in chemistry. In 1770 he accompanied as secretary Admiral Knowles to Russia, whither he was going to effect a reformation in the navy of that country. In that position he remained for 2 years at St. Petersburg, and was made inspector-general of the corps of marine cadets at Cronstadt, with the rank of lieutenant-colonel. In Sept. 1774, he returned to Edinburgh as professor of natural philosophy in the university, and fulfilled the duties of that office for the remaining 30 years of his life. In 1798 he was made doctor of laws by the university of New Jersey, the next year received the same honor from the university of Glasgow, and in 1800 was elected successor to Dr. Black as foreign member of the royal academy of sciences at St. Petersburg. His first published production was a paper communicated to the royal society of Edinburgh in 1780, on the determination of the orbit and motions of the Georgium Sidus. He contributed also a large number of scientific articles to the "Encyclopædia Britannica." In 1797 appeared a work of his entitled "Proofs of a Conspiracy against all the Religions and Governments of Europe" (8vo., Edinburgh). His last work was entitled "Elements of Mechanical Philosophy" (8vo., Edinburgh, 1804).

ROCHAMBEAU, JEAN BAPTISTE DONATIEN DE VIMETRE, count de, a French soldier, born in Vendôme, July 1, 1725, died May 10, 1807. He entered the military service in 1742 during the war of the Austrian succession, and distinguished himself in the campaigns of 1744 and 1746. Promoted to a colonelcy in 1747, he was wounded in the battle of Laufeld, and was active at the siege of Maestricht in 1748. After the conclusion of the peace of Aix la Chapelle, he became governor of Vendôme, resumed active service on the breaking out of the 7 years' war, was appointed brigadier-general in 1756 after the taking of Mahon, then served in Germany, received several wounds in the battle of Olostercamp in 1760, and was promoted in 1761. In 1780, being a lieutenant-general, he was placed in command of the French army sent to America, and in the following year acted in concert with Washington in the operations which brought about the capitulation of Cornwallis at Yorktown. Peace being concluded, he returned to France in 1783, and was made governor of Picardy and Artois. He became

in 1791 commander of the French army in the north, but soon resigned. He was incarcerated in 1793, arraigned before the revolutionary tribunal, and sentenced to death; but on his name being called for execution, it was found that the cart which transported the prisoners to the place of execution was already filled up, and the superintending officer pushed him back, saying: "Stand back, old fellow; your turn will come later." Robespierre fell before his turn came, and he was liberated. He left *Mémoires* which were printed in 1809 (2 vols. 8vo., Paris). —DONATIEN MARIE JOSEPH, son of the preceding, born in 1750, killed at Leipsic, Oct. 18, 1813. A colonel in 1779, he accompanied his father to America; became lieutenant-general in 1792; was sent to St. Domingo against the rebellious negroes; went in 1793 to Martinique, whence he expelled the English, and caused the government of the republic to be acknowledged in all the French colonies. In 1794, being besieged at Port Royal by superior forces, he was forced to capitulate after resisting for 40 days. Returning to France, he joined the army of Italy in 1800; was afterward sent under Gen. Leclerc to Hayti, and in 1802 defeated Toussaint L'Ouverture. Becoming commander-in-chief on Leclerc's death, his cruelty excited indignation and hatred among all classes. The insurgents renewed their efforts; and in 1803, his troops being greatly reduced in numbers, he was obliged to surrender. Taken prisoner on the French coast, he was carried to England, and exchanged after 8 years' captivity. In 1813 he fought bravely at Bautzen and Wolfberg, and fell at the battle of Leipsic.

**ROCHDALE**, a town of Lancashire, England, on both sides of the river Roch, 10 m. N. N. E. from Manchester; pop. in 1851, 29,195. Rochdale is largely engaged in manufactures, chiefly flannels, blankets, cotton goods, and yarn. In the immediate neighborhood there are extensive coal and iron mines, and quarries of building stone. The woollen manufacture was introduced, in the reign of Edward III., by some Flemish immigrants. The town sends one member to parliament.

**ROCHEFORT**, or **ROCHEFORT-SUR-MER**, a fortified town of France, in the department of Charente-Inférieure, situated on the right bank of the Charente, about 9 m. from its mouth, and 20 m. S. from Rochelle; pop. in 1856, 21,372. It was a place of no importance till about 1666, when, being selected by Colbert for a port, the harbor was enlarged, and the city was founded and fortified by Vauban. It ranks now as the third naval establishment in France.

**ROCHEFOUCAULD**. See **LA ROCHEFOUCAULD**.

**ROCHEJAQUELEIN**. See **LA ROCHEJAQUELEIN**.

**ROCHELLE**, or **LA ROCHELLE**, a fortified town of France, capital of the department of Charente-Inférieure, situated on the bay of Biscay, 245 m. S. W. from Paris; pop. in 1856, 14,157. Ship building is extensively carried

on, and the manufactures consist principally of pottery, glass, and cotton goods. Previous to 1872 Rochelle was several times held by the English. It fell into the hands of the Huguenots in 1557, and they retained possession of it till 1628, when they surrendered it after a siege of 14 months, upon honorable terms. The mole is still visible that was constructed by Richelieu to close the harbor on this occasion.

**ROCHELLE SALT**, or **SALT OF SEIGNETTE**, a double salt, discovered by Seignette, an apothecary of Rochelle, consisting of an equivalent of tartrate of potash and one of tartrate of soda combined with 8 equivalents of water, as expressed by the formula  $KO, NaO, C_2H_3O_6, 8HO$ . It is formed by neutralizing 12 oz. of carbonate of soda dissolved in 5 pints of boiling water by gradually adding 16 oz. of bitartrate of potash (cream of tartar). It crystallizes in large right rhombic prisms of 6, 8, or 10 sides. The salt is used in medicine as a gentle, cooling purgative, well suited to delicate stomachs. It is almost tasteless, and may be given in soup or beef tea in sufficient dose without its presence being suspected. It is also largely used as an ingredient of Seidlitz, or, as they are sometimes called, Rochelle powders. These consist of a mixture of 120 grains of Rochelle salt and 40 grains of bicarbonate of soda, which are put in a blue paper, and 35 grains of tartaric acid put in a white one. The contents of each are dissolved in separate portions of water, which are then poured together, and the draught is taken while effervescing.

**ROCHESTER**, a city, port of entry, and the capital of Monroe co., N. Y., on the Genesee river, 7 m. from its mouth in Lake Ontario (its height above which is 266 feet), 229 m. W. N. W. from Albany, and 68 m. E. N. E. from Buffalo; pop. in 1815, 331; in 1820, 1,502; in 1830, 9,207; in 1840, 20,191; in 1850, 36,403; in 1860, 48,096. The Erie canal and the New York central railroad (with two branches running respectively to Buffalo and Niagara Falls) pass through it, and it is the largest town on the line of those works between Albany and Buffalo, and the 5th in size in the state. The Genesee valley canal and the Genesee valley railroad terminate here. The Genesee river has a perpendicular fall of 96 feet within the city, another of 25 feet  $1\frac{1}{2}$  m. below, and a third of 84 feet 100 rods from the latter. From the upper fall it flows through a deep gorge, its banks increasing in height with the different falls from 100 to 220 feet. The site of the city is nearly level, and occupies an area of about  $10\frac{1}{2}$  sq. m. It is regularly laid out, so far as the windings of the river and the canals will permit, with streets from 60 to 80 feet wide, planted with shade trees; it is divided into two nearly equal parts by the river, which is crossed by 4 bridges on the lines of the principal streets running E. and W.; there are also numerous bridges over the canals. The dwellings of the city are mostly detached, built of brick or limestone, and surrounded by

grounds and fruit yards; many of them are large and costly, and their number (9,140) very nearly equals that of families (9,305). The combined court house and city hall, and several of the business blocks, banking houses, churches, &c., are handsome structures. The railroad depot is one of the largest and finest edifices of its class in the state. The canal aqueduct over the Genesee is built of stone, 848 feet long and 45 feet wide interiorly, with 7 arches, and cost \$600,000.—There are 46 churches, of which 4 are Baptist, 4 Episcopal, 2 Friends', 8 Methodist Episcopal, 10 Presbyterian, 7 Roman Catholic, and 1 each Brethren in Christ, Christian, Congregational, Evangelical Association, German Evangelical, German Reformed, Jewish, Reformed Dutch, Second Advent, Unitarian, and Universalist. The value of church edifices is about \$700,000, and the number of sittings 25,000. The public schools are managed by a board of education of 12 members and a superintendent. There are 16 primary, 16 intermediate, and 10 grammar schools, and a high school, with 95 teachers and an average of 4,484 pupils; total expenditure in 1860, \$55,646, of which \$32,700 was for teachers' wages. There are also several private schools of a high order. The university of Rochester, established in 1850 by the Baptist denomination, had in 1860 6 professors, 165 students, and 196 alumni, and a library of more than 6,000 volumes. New buildings have recently been erected at a cost, including 20 acres of land, of \$75,000. It has an optional scientific course independent of the classical one. The Rochester theological seminary, established in 1850, had in the same year 3 professors, 44 students, and a library of about 7,000 volumes, of which 5,000 were purchased from the library of Neander, the church historian. Both institutions are well endowed. The Rochester Athenæum and mechanics' association has 600 members, a large reading room, and a library of 11,000 volumes, and sustains an annual course of lectures. There are 8 daily newspapers, issuing tri-weekly and weekly editions; 4 weekly newspapers, one of which is agricultural and 2 in the German language; 2 monthly periodicals, one agricultural and one literary; and a "Rural Annual and Horticultural Directory." The western house of refuge, a state reformatory institution for boys, opened in 1849, occupies a large building with 42½ acres of ground; at the close of 1860 it had 423 inmates, who are employed in various manufactures; current expenditures in 1860, \$35,763.32; receipts, \$17,071.43. The Monroe county penitentiary, which receives convicts from 13 counties, went into operation in 1854. It is conducted on the Albany plan, has an average of 200 male and 50 female inmates, and in 1860 yielded an income of \$3,000 over expenditures. There are two hospitals—St. Mary's (Roman Catholic), with about 150 patients, mostly free, and the city hospital, which has its main building erected, but is not yet

(Sept. 1861) in operation. There are also a Catholic and a Protestant orphan asylum, a home for the friendless, and several other charitable institutions and societies. Mount Hope cemetery occupies an elevated and picturesque site of 71 acres, and is one of the most beautiful rural cemeteries in the Union.—The climate of Rochester is mild, the mean annual temperature being 46.92° F.; the average of the summer months is 70.77°, of the winter 25.88°, and of the spring and autumn 46°. It is especially favorable to fruit culture, and the nurseries of fruit and ornamental trees in and around the city cover about 4,000 acres, with an annual sale of more than \$1,000,000. A single nursery, probably the largest in the world, occupies 500 acres, and there are others of 850 and 250 acres. Rochester is the centre and commercial emporium of that fertile region known as the "Genesee country," famous especially for the fine quality of its wheat, though for some years previous to 1860 its amount had been greatly diminished by insects. This, together with its immense water power, made the manufacture of flour for many years the leading industrial interest of the place, large quantities of wheat being imported from distant points; and in 1860 it had 24 mills with 125 runs of stones, capable of grinding 800,000 bbls. per annum, and actually producing about 600,000. The value of flour produced in 1855, according to the state census, was \$5,482,998. There were several shoe manufacturing establishments employing 200 to 500 men each, 39 coopers' shops, 15 breweries, 14 building yards for canal boats (most of those used in the state being built here), 13 coach and wagon factories, 10 machine shops, 7 agricultural implement manufactories, 4 tanneries, 2 cotton factories, and a multitude of minor establishments; the capital invested was \$4,489,080, distributed among 89 different branches, and the value of products \$10,082,540; hands employed, 4,569.—The port of Rochester, at the mouth of the Genesee, has a good harbor with two long piers and a lighthouse; the river is navigable to the lower fall, 2 m. below the city, and there is also a railroad to the lake. The shipping of the district on June 30, 1859, amounted to 3,982 tons enrolled and licensed. The custom house returns for 1860 were: imports, \$477,616; exports, \$357,576. For internal commerce the railroads and canals, ramifying in all directions, give unlimited facilities. There were 7,767 canal cargoes first weighed at Rochester in 1860, amounting to 1,099,650 tons; the receipts of the railroads at that point were \$686,960, of which \$380,813 was from passengers. There are 9 banks of discount and circulation, with a capital of \$2,500,000, and 2 savings banks, whose deposits on Jan. 1, 1861, were \$2,656,570.75.—Rochester is divided into 12 wards, each of which elects 2 aldermen to serve for 2 years. The mayor is elected annually. The fire department consists of 12 com-

panies, numbering 688 men. Arrangements are now (1861) making to supply the city with water from a distance of 14 m. The gas company (capital \$240,000) has 26 m. of mains, and supplies 600 public lamps and 2,400 private consumers. The taxable property of the city was assessed in 1860 at \$11,252,157, but the real value is about \$26,000,000, of which \$20,000,000 is real estate and \$6,000,000 personal property.—The first permanent settlement on the site of Rochester was made in 1810. There were but two frame buildings in 1812, when it was first laid out for a village by Nathaniel Rochester (after whom it was originally called Rochesterville) and two associates from Maryland, who had purchased the land. It was incorporated as a village in 1817, and as a city in 1834. The mysterious sounds long called "Rochester knockings," attributed to spiritual agency, were introduced from an adjoining county, and never made many converts here.

ROCHESTER, JOHN WILMOT, 2d earl of, a wit and satirist of the court of Charles II., born in Ditchley, Oxfordshire, April 10, 1647 or 1648, died July 26, 1680. He left Oxford university in 1661 to travel in France and Italy, and returning in his 18th year was welcomed for his graceful person and lively wit as a congenial acquisition to the gay circles of the court. In 1665 he served at sea under the earl of Sandwich, and in 1666 under Sir Edward Spragge, distinguishing himself by courage and intrepidity on several occasions; but he lost the reputation thus acquired on returning to London, by dishonorable evasion of the consequences of quarrels of his own seeking. He was a great favorite with the king, though his sharp satires were often offensive; and he was made by him a gentleman of the bedchamber and ranger of Woodstock park. He became addicted to intemperance soon after his arrival at court, and afterward confessed to Dr. Burnet that for 5 years he was continually intoxicated. He soon became famous for debauchery and buffoonery, often disguising himself as a mountebank, an alchemist, a porter, or a beggar, characters which he sometimes used as a cover for low amours. Being at length prostrated by disease, he was converted from the infidelity which he professed and brought to hearty contrition for his profligate career by intercourse with Dr. Burnet, who by his desire afterward published "Passages of the Life and Death of John, Earl of Rochester." His life was also written by Dr. Johnson in the "Lives of the Poets." On his deathbed Rochester directed the destruction of all his profane and licentious writings; but a collection appeared under his name soon after his death, and one of still worse character in 2 vols. in 1731-2, much of which is believed to be spurious. Of his genuine poems, such as his "Satire against Man," "Verses upon Nothing," &c., Dr. Johnson says that they everywhere exhibit "tokens of a mind which study might have carried to excellence." His letters to his wife and son, recent-

ly published, show him in a somewhat more favorable light. His only son died a minor in 1681, when the title became extinct.

ROCK, a S. co. of Wis., bordering on Ill., intersected N. and S. nearly in the middle by Rock river, and drained by its branches; area, about 750 sq. m.; pop. in 1860, 36,691. Its surface is nearly level, with much prairie, especially to the E. of Rock river, which is nearly all occupied by Rock prairie; and the soil is very fertile. The productions in 1850 were 784,278 bushels of wheat, 300,143 of Indian corn, 487,880 of oats, 102,383 of potatoes, and 410,881 lbs. of butter. There were 9 saw mills, 8 newspaper offices, 52 churches, and 4,286 pupils attending public schools. It is intersected by the Beloit and Madison, the Chicago and north-western, and the Milwaukee and Mississippi railroads. Capital, Janesville.

ROCK CASTLE, a S. E. co. of Ky., bordered S. E. by Rock Castle river, by the branches of which and Dick's river it is drained; area, about 350 sq. m.; pop. in 1860, 5,343, of whom 357 were slaves. It has an uneven surface and a not very fertile soil. The productions in 1850 were 177,974 bushels of Indian corn, 3,715 of wheat, 28,853 of oats, 5,543 lbs. of tobacco, and 10,226 of wool. There were 14 churches, and 425 pupils attending public schools. Capital, Mount Vernon.

ROCK ISLAND, a N. W. co. of Ill., separated from Iowa by the Mississippi, intersected and bounded S. E. by Rock river; area, 426 sq. m.; pop. in 1860, 21,007. It has a diversified surface and fertile soil. Bituminous coal is found in abundance. The productions in 1860 were 295,614 bushels of wheat, 1,176,446 of Indian corn, 138,016 of oats, 12,595 of barley, 89,165 of potatoes, 67,813 lbs. of tobacco, and 23,568 tons of hay. There were 2 saw mills, a tannery, 4 newspaper offices, 41 churches, and 6,024 pupils attending public schools.—ROCK ISLAND, the capital, is situated on the Mississippi at the foot of the upper rapids, opposite Davenport, Iowa, 3 m. above Rock river, and 181 m. W. by S. from Chicago; pop. in 1860, 5,130. It is opposite the W. extremity of an island about 3 m. long, from which it derives its name, and on which a national armory is to be erected. The main channel is on the N. side, while a dam on the S. side affords immense water power above and a good harbor below. It has a number of manufactories, and is the point at which the Chicago and Rock Island and the Mississippi and Missouri railroads meet by means of a bridge over the Mississippi.

ROCK MOSS. See LYCOPODIAE.

ROCK OIL. See PETROLEUM.

ROCK SNAKE. See PYTHON.

ROCKBRIDGE, a central co. of Va., intersected by North river, a branch of the James, and bordered S. E. by the Blue ridge; area, about 700 sq. m.; pop. in 1860, 17,250, of whom 8,984 were slaves. It has a mountainous surface and very fertile soil. The productions in 1850 were 372,705 bushels of Indian

corn, 198,553 of wheat, 162,752 of oats, 78,298 lbs. of tobacco, 80,469 of wool, and 7,626 tons of hay. There were 16 grist mills, 4 saw mills, 2 newspaper offices, 18 churches, and 289 pupils attending public schools. Value of real estate in 1856, \$5,200,696, showing an increase of 50 per cent. since 1850. It derives its name from the Natural Bridge. (See BRIDGE, NATURAL.) Capital, Lexington.

ROCKET, an explosive missile, used as an element in pyrotechnical exhibitions, as a signal at night, as a projectile weapon, and as a means of carrying a line to inaccessible objects, as to a wreck from the shore. The common sky rocket having been already described under PYROTECHNY, the present article will be limited to an account of the so called war rocket. The use of rockets in war was proposed as long ago as 1598 by J. Hanzelet in his *Traité militaires* of that date; but no progress was made toward this end until the experiments of Sir William Congreve in the early part of the present century. He substituted for the ordinary paper case one of sheet iron, which, bearing a heavier charge, would be propelled further; and in order to secure greater accuracy in the flight, he removed the balance or guiding stick from the side and screwed it into the centre of a disk, which was fitted into the open end of the rocket after this was completed, and the core employed to form the hollow in the rocket was removed. But as this end must remain open for the expulsion of the gases which by their reaction push the rocket forward, the rocket stick was made to taper off to the point where it was screwed into the disk, so that room might be afforded for a number of holes in the annular space around the end of the stick. The whole was thus made straight, and when uniformly charged with the granulated powder composition, rammed hard, its movement must be in nearly a direct line. To prevent the composition from being injuriously affected by the iron, a lining of paper or other material was found to be necessary. The head of the rocket was formed of a mass of iron which served as a shot, or it was a shell, or a receptacle for inflammable compounds, known as a carcass. For field operations, the rockets usually employed by the British armies have been 6, 12, and 18 pounders; but they have been made much larger than this, even of 800 lbs. and of 10 feet length. The advantages of the weapon are its great portability as compared with cannon, the unlimited size of which it may be made, the freedom from recoil, which admits of their being used from any boats of size sufficient to carry them, the rapidity with which they may be fired, and the devastating and terrifying effects of the fire they carry. Against cavalry they are also doubly effective for their terribly whirling sound, which no horses can withstand. To insure their direct flight, they are shot from tubes which are pointed either from a tripod or upon the ground. The Congreve rocket was employed with great

effect in the naval attack of the British upon Boulogne, Oct. 8, 1806, the town being set on fire in the course of half an hour by the discharge of about 200 of them. In 1807 they were also effectively used in the attack at Copenhagen; and at the battle of Leipsic a mass of French infantry were instantly routed by a volley of rockets. The long stick appended to rockets has always been an awkward incumbrance to them, and many attempts have been made to devise some convenient substitute for it. This was accomplished previous to the Crimean war by Mr. Hale, of England, by giving to the holes for the exit of the flames at the periphery of the lower end of the rocket a tangential direction. The effect of this is to cause the rocket to rotate on its axis like a Minié ball; and in order that the rocket may not start off before sufficient force has been accumulated to keep its head from drooping, Mr. Hale contrived a case in which it is held for an instant, till it breaks through the springs which retain it. The rockets for the British army were charged at Woolwich by hydrostatic pressure, thus being made to hold more of the composition, and this of greater efficiency by reason of its compactness. In the trials which were made at Woolwich, a 10-pounder rocket fired from an iron tube at an angle of elevation of 20° struck the ground at the distance of 5,200 feet, and penetrated 10½ feet into wet, close, loamy soil. Trials at Washington, made Jan. 5, 1847, were of six 2-inch and four 3-inch rockets, with shot heads, and of three 2-inch and two 3-inch, with shells. About 2,000 were made at the arsenal at Washington, of 2½ and 3½-inch sizes, for use in the Mexican war. It is probable that the capabilities of rockets are not yet fully appreciated. Mr. William Greener, in his "Gunnery in 1858," from his experience with rockets, expresses the opinion that, discharged from a gun, their flight may be made not only as direct as that of a bullet from a rifle, but also much longer, and with the combustion of less powder. When fired from a cannon the case should be cast of gun metal of strength sufficient to withstand the concussion, and it should be provided with grooves or suitable projections on the outside to fit the rifling of the cannon. The gunpowder should be of very slow combustion, a starting velocity of 500 to 800 feet a second only being required, until the projectile is taken on by its own charge. From the gradual manner in which the rocket is started, it is not unlikely that it will be found practicable to use in its head, for explosion on striking, fulminates of a more violent kind than can be used in ordinary shells on account of their exploding as the shell receives its first impulse.—In cases of shipwreck the rocket has proved a most valuable means of saving life; and it is now kept, together with life boats, at stations on the coast where wrecks often occur. When a vessel is stranded within a quarter of a mile of the beach, and cannot be reached by life boats on

account of the heavy surf, a line of  $\frac{1}{4}$  inch diameter attached to a rocket may be sent over the ship, and thus afford the means to those on board of passing a heavier line to the shore by which they may themselves be enabled to reach it. With the rockets used by Mr. Greener, lines have thus been carried from 600 to 800 yards.

ROCKFORD, the capital of Winnebago co., Ill., on the E. bank of Rock river, and on the Galena and Chicago railroad, 92 m. W. N. W. from Chicago; pop. in 1860, 5,281. It is situated at the rapids, which furnish great water power, and has several manufactories. A ferry communicates with the opposite side of the river. It contains a court house, a bank, 2 newspaper offices, and 5 churches.

ROCKINGHAM. I. A S. E. co. of N. H., bordered E. by the Atlantic and S. by Massachusetts, and separated from Maine on the N. E. by the Piscataqua river; area, about 700 sq. m.; pop. in 1860, 50,110. It is watered by the Lamprey, Exeter, Beaver, and Spigot rivers. Great bay, a body of water communicating with the Piscataqua, is on the N. E., and Massabesic lake on the W. border. Its surface is uneven and the soil fertile. The productions in 1850 were 201,359 bushels of Indian corn, 62,407 of oats, 668,395 of potatoes, 4,115 of wheat, 72,185 tons of hay, 44,475 lbs. of wool, and 736,222 of butter. There were 85 grist mills, 75 saw and planing mills, 6 cotton and 9 woollen factories, 3 founderies, 5 machine shops, 3 paper mills, 20 tanneries, 2 ship yards, 5 newspaper offices, 103 churches, and 11,045 pupils attending public schools. It is intersected by the Manchester and Lawrence, the Portsmouth and Concord, the Boston and Maine, and the eastern railroads. County towns, Portsmouth and Exeter. II. A N. E. co. of Va., bordered S. E. by the Blue ridge and N. W. by the Shenandoah mountains, and drained by the Shenandoah river and its branches; area, about 850 sq. m.; pop. in 1860, 28,408, of whom 2,887 were slaves. It occupies part of the great valley of Virginia, and has an uneven surface and fertile soil. The productions in 1850 were 608,850 bushels of wheat, 448,585 of Indian corn, 164,976 of oats, 16,067 tons of hay, 46,013 lbs. of wool, and 736,222 of butter. There were 41 grist mills, 22 saw mills, 16 tanneries, 4 wool-carding mills, 2 newspaper offices, 80 churches, and 1,970 pupils attending public schools. Value of real estate in 1856, \$8,338,738, showing an increase of 20 per cent. since 1850. Capital, Harrisonburg. III. A N. co. of N. C., bordering on Va., intersected by the Dan, and drained by the head waters of the Haw river; area, about 350 sq. m.; pop. in 1860, 16,746, of whom 6,318 were slaves. It has an elevated and hilly surface and fertile soil. The productions in 1850 were 377,604 bushels of Indian corn, 101,804 of oats, 44,156 of wheat, and 908,729 lbs. of tobacco. There were 5 saw mills, 1 cotton, 1 woollen, and 27 tobacco factories, 18 churches, and 1,015 pupils attending public schools. Capital, Wentworth.

ROCKINGHAM, CHARLES WATSON WENTWORTH, marquis of, an English statesman, born May 13, 1730, died July 1, 1782. At the age of 20 he succeeded his father in the marquise. Though his natural abilities were not great, his amiability, generosity, and integrity, along with his vast wealth, combined to make him a prominent political leader. In Feb. 1760, he was made a knight of the garter. In 1765 he succeeded George Grenville in the premiership, with the position of first lord of the treasury, and from that time until his death was the acknowledged leader of the liberal branch of the aristocracy. The ministry of which he was the head had not in it one man of commanding ability, and was ill fitted to cope with a powerful opposition and with the distracted condition of the American colonies. Although it contained members who had voted against the passage of the stamp act, it did not undertake to repeal it, but made preparations to execute it in all the colonies. The general resistance which the attempt met with throughout America, and the impossibility of enforcing its provisions except at the point of the bayonet, led to a repeal of the act in March, 1766; but at the same time an act was passed declaring the supreme power of parliament over America in all cases whatsoever. On July 12 Rockingham retired from power, and during the administration of Lord North was at the head of the aristocratic portion of the opposition. On the resignation of North, Rockingham formed a ministry in March, 1782, which ended at his death.

ROCKLAND, a S. E. co. of N. Y., bordered E. by the Hudson river and S. W. by New Jersey, and drained by the Hackensack and Ramapo rivers and several smaller streams; area, 208 sq. m.; pop. in 1860, 22,492. It has a rough and mountainous surface, the highest summits having an elevation of 1,000 feet, and the soil is fertile. The rocks yield an excellent red sandstone, extensively quarried and exported for building, and immense quantities of lime are made from the white limestone which abounds in the N. E., where also are great beds of fine clay, from which 150,000,000 bricks are annually manufactured, employing over 1,000 men. Rockland lake, about 1 m. from the Hudson, is a beautiful sheet of water, 160 feet above the river; it is noted for its yield of ice, of which 200,000 tons are annually exported, and the collection of which gives employment to 1,000 men during the season. The productions in 1855 were 123,441 bushels of wheat, 28,168 of oats, 81,600 of rye, 51,873 of Indian corn, 47,223 of potatoes, 14,828 tons of hay, and 266,006 lbs. of butter. There were 7 saw mills, 13 grist mills, 2 newspaper offices, 41 churches, and 6,995 pupils attending public schools. It is intersected by the New York and Erie railroad. Capital, New City.

ROCKLAND, formerly East Thomaston, the capital of Knox co., Me., on the W. side of Penobscot bay, 40 m. S. E. from Augusta; pop. in 1860, 7,316. The harbor is broad and deep,



and there is a very active trade, particularly in the exportation of lime, made from immense quarries of limestone in the vicinity. There are 64 lime kilns, 34 being of new and patented construction, burning in the aggregate over 5,000 casks daily. About 150 schooners are employed in carrying the lime, mostly to Boston and New York. Beside these, about 18 ships, 40 barks, and a number of brigs belong to the port. There are 3 banks with an aggregate capital of \$200,000, 2 insurance companies, 2 weekly newspapers, and 8 churches.

**ROCKY MOUNTAINS**, the chain of mountains in the central and western portions of the North American continent, being the continuation northward of the Cordilleras of Central America and Mexico. The S. portion of the great chain to the N. border of Mexico is treated in the articles **ANDES** and **CORDILLERA**. From Mexico the chain continues in several ranges through the territories and states lying between the Pacific and the head waters of the streams that flow into the Mississippi, spreading out over a wide area of full 1,000 m. from E. to W. Having traversed these, the chain, still composed of several ranges, passes into the British possessions to the N., the eastern range reaching the Arctic ocean in about lat. 70° N., and the western passing near the coast and terminating near Prince William's sound, where Mt. St. Elias in lat. 60° stands upon the borders of the Pacific at the height of 17,800 feet above its level, perhaps the highest peak of the whole chain. It is asserted that spurs are traced from the extremities of these ranges directed toward Behring's straits, and it is supposed that the great American system of mountains may here connect with that of eastern Asia, which from Kamchatka extends through the continent, reaching the Indian ocean in the island of Sumatra. The portion of this vast system known as the Rocky mountains is itself of such immense extent and so little explored, that the outlines even of its principal groups of mountains and valleys have not yet been well defined, and their character is very imperfectly understood. Our knowledge of that part of them in the United States is derived from the reports of the various expeditions sent out by the government, commencing with those of Lewis and Clark in 1804. During the next 40 years other explorations were made by Harman, Ross Cox, Long, Schoolcraft, Bonneville, Nicollet, and Fremont, notices of some of which may be found under these names. Since 1844 more than 20 expeditions have been engaged in exploring these wild regions, nearly all of them for the U. S. government, and since the bill and appropriations of congress of March, 1853, the object of most of them has been the determination of the most practicable route for a railroad from the valley of the Mississippi to the Pacific. The information thus acquired is embodied in the Pacific railroad report, memoir, and maps, prepared by Lieut. G. K. Warren, U. S. topo-

graphical engineers, under direction of Capt. A. A. Humphreys, director of the department of explorations and surveys, and finally published among the congressional reports in 1859. (See **PACIFIC RAILROAD**.)—The territory occupied by the Rocky mountains reaches from the shores of the Pacific in California to about long. 105° W., or it may be considered as extending 125 m. further E., taking in the Black hills of Nebraska. Even beyond these limits, in the plains of the tertiary and cretaceous formations, which extend E. from the base of the mountains, and in the islands off the Pacific coast, are ridges and peaks that mark a still wider extension of the forces to which these mountains owe their existence. The whole area properly included by the mountains and their intervening valleys and desert lands in the territory belonging to the United States is computed at about 980,000 sq. m. The general range of this mountainous district is N. 20° W.; but that of the several belts of mountains is very various, and is determined only in isolated localities where they have been crossed by the explorers.—The mountainous belt of E. New Mexico and of Colorado territory, first encountered in crossing the great plains that lie along the upper portions of the streams which flow S. E. into the gulf of Mexico, and E. toward the Mississippi, has a general N. and S. direction. Santa Fé, the capital of New Mexico, is situated on this belt, and further N. it includes in the same territory the Spanish peaks. Pike's peak is on its E. margin, and in Colorado and Nebraska are those portions of the mountains known as the Three Parks, and the Medicine Bow mountains. From Long's peak, about 150 m. N. from Pike's peak, and in about lat. 40°, the range trends toward the N. W., connecting with the Wind River mountains, upon which is Fremont's peak, 13,570 feet above the level of the sea. Beyond that peak to the N. boundary of the United States it separates Dacotah and Washington territories. Though the eastern range of the Rocky mountains is not surpassed in the height and magnitude of its ridges by other portions of the chain, it is not entirely the water-shed between the rivers that flow into the gulf of Mexico and those into the gulf of California. The Rio Grande flows in a S. direction across New Mexico along the W. side of the range, crossing it near the borders of Texas; and the N. fork of Platte river, commencing in numerous branches in the North park on the W. side of the Medicine Bow mountains, flows nearly 200 m. N. before it finds a passage across the range to the E. The sources of these rivers that flow into the Atlantic interlock with the branches of the Gila and the Colorado, whose outlet is the Pacific; and the passage of the streams named through the range determines the route of two of the lines of travel between the valley of the Mississippi and California. Further N. the drainage of the E. slopes is into the Yellow-

stone and the head waters of the Missouri, which, flowing N. W. along the E. base of the mountain, attain to such depth in the N. W. portion of Nebraska that steamboats ascend to the Great falls at the base of the Rocky mountains and more than 2,500 m. from the junction of this river with the Mississippi. On the opposite side the drainage is into the S. or Lewis's fork of the Columbia river, and into the N. or Clark's fork of the same. The sources of the latter nearly reach some of the branches of the upper Missouri, and the pass known as Lewis and Clark's in lat. 47° is through one of the depressions where these waters nearly meet. This is the most northern pass in the United States, and is the route of the proposed northern railroad to the Pacific. In British America the Rocky mountains divide the waters of the Pacific from those which flow into Hudson's bay, as the Saskatchewan and Athabasca, and also from Mackenzie's river, whose outlet is the Arctic ocean.—The next great range of the Rocky mountains toward the W. is that called the Wahsatch mountains, lying S. from Great Salt lake, and under this and other names passing N. to the E. of that lake. Toward the S. W. this mountainous region is traced along the W. side of the Colorado toward the Sierra Nevada, which bounds California on the E. In Utah the mountains spread over a wide district, and the ridges of the several groups lie in various directions, the course of those known as the Uintah mountains, E. of Great Salt lake, being E. and W. The only drainage from these mountains into the ocean is from their E. and N. sides. By the Colorado the waters are conducted S. W. to the head of the gulf of California in lat. 32°, and by Lewis's fork of the Columbia N. W. to the Pacific in lat. 46°. Nearly the whole distance between these points, and for a width of about 10° of longitude, stretching E. from the Sierra Nevada, is a vast territory but little explored, from 4,000 to 5,000 feet above the level of the sea, known to abound in rivers and lakes, some of them salt, from which there is no outlet into the ocean. Into this great interior basin flow all the waters that fall on the W. slopes of the Wahsatch range and the E. slope of the Sierra Nevada. In the British possessions this portion of the chain unites with the main dividing range of the Rocky mountains.—The western portion of the Rocky mountain chain commences at the S. extremity of the peninsula of Lower California, and follows this to its junction with the mainland. Entering the state of California, it soon branches into two ranges, the principal one, known as the Sierra Nevada or Snowy mountains, passing through the state at a distance of about 160 m. from the coast, while the inferior group of parallel ridges, known as the Coast range, keeps within 10 to 50 m. of the Pacific shore, till it again becomes connected with the Sierra Nevada in the confused groups in N. California, where Mt. Shas-

ta stands prominent among the other peaks at an elevation of about 14,000 feet above the level of the sea. The character of the mountains of California and the heights of the principal peaks are given in the article CALIFORNIA, vol. iv. p. 250. Through Oregon and Washington territory the distinction is still continued between the main range or the Sierra Nevada, here known as the Cascade mountains, and the hills near the Pacific or the Coast range. A remarkable feature in the former range is the complete barrier it forms to the drainage of the waters on its E. side toward the Pacific. No outlet is afforded to these from the S. termination of the range at the extreme end of the peninsula, in the latitude of the tropic of Cancer, to the Columbia river in lat. 46°. This great stream for a considerable portion of its course makes the boundary between Oregon and Washington, and drains the wide valleys that stretch E. to the main range of the Rocky mountains—its N. or Clark's fork, as already remarked, reaching to the sources of the Missouri, and its S. or Lewis's fork, called also Snake river, being fed by numerous branches that flow through the valleys among the mountains N. E. of Great Salt lake, where also rise the tributaries of the Colorado and the Sweetwater, which flows into the N. fork of the Platte river. By the Columbia river consequently, although its navigation is interrupted by the cascades in its passage through the Sierra Nevada, is one of the most important routes across the mountains. In the N. W. part of Washington territory the Coast range is penetrated by deep straits and bays from the Pacific, and fine navigable waters extend into the heart of this territory between the two ranges of mountains. The Coast range traverses the central portion of Vancouver's island for its whole length, and on the mainland in British Columbia the Sierra Nevada continues northward, and is crossed by Fraser river, the outlet of which is in the gulf of Georgia opposite the S. portion of Vancouver's island. Though the Sierra Nevada in its range between California and Nevada territory is crossed by no rivers, several of the streams which flow down its E. slopes have their sources high up on the summits, and near those which flow down the W. slopes. Several depressions are met with at these points, which serve as passes for the routes from Sonora, Sacramento, and Marysville to the E. By the cañon of Carson river the range is crossed at an elevation of about 7,250 feet; and by the Truckee pass, where the waters of the Yuba river and those of the Truckee, flowing E., nearly meet each other, the elevation is about 6,000 feet. From these passes the route is N. E. to the main road, which crosses the Sierra Nevada in the N. portion of California, and which toward the E. passes by the Humboldt mountains to Salt Lake City. To the E. of Salt Lake this route continues across the Wahsatch mountains to the Great South pass through the Wind River mountains

just S. of Fremont's peak, and thence down the Sweetwater to the North fork of the Platte river. A more southern route connects Pike's peak with the Utah valley, and thence turning S. W. crosses the Sierra Nevada near its junction with the Coast range in S. California, meeting here the route from Santa Fé through New Mexico, and the still more southern one from Texas, which follows the valley of the Gila and crosses this river and the Colorado at their junction.—While the Rocky mountains exhibit in portions of the chain a parallelism of ridges, with no prominent elevations greatly exceeding in height the average summit level (features which more particularly characterize the Appalachian system), the contour of the surface is in general much more irregular than that of the Alleghanies, owing to the frequent occurrence of deep transverse valleys and canyons, which, worn back toward the summits, give to these the serrated aspect from which originated the Spanish name *sierras*. Many of the mountains are also of granitic structure, and assume in a marked degree the alpine character of precipitous and rugged peaks, as is seen especially in the Wind River mountains. Several of the principal summits, which rise considerably above the general height of the mountains, have already been named. They occur both on the extreme E. and W. ranges, and none of them, except Mt. St. Elias, it is believed, attain a greater height than 16,000 feet above the sea. In British Columbia are two important summits on the E. range, in about lat. 53°, Mt. Brown and Mt. Hooker, the one estimated at 16,000 feet, and the other at 15,700. To the N. of these the range gradually declines toward the Arctic ocean. In this northern portion of the chain the summits are covered with perpetual snow, and such is the case with the highest peaks lying in the territories of the United States. Those of the Wind River mountains were found by Fremont thus clothed in August, the snow extending 1,000 feet below the crests. Below the snow line the mountains are covered with the dark evergreen growth of the hemlock, spruce, balsam fir, and tall pines; and still further down are interspersed among them the birch, beech, cherry, and various other trees, while along the streams are found groves of cottonwood and willow. Over large districts, however, the forest growth is often exceedingly sparse, and even the grass that covers the plains, and upon which travellers depend for the sustenance of their animals, is parched and disappears in the long droughts to which these regions so remote from the sea are subject. In the sandy regions along the N. fork of Platte river above Laramie river an extraordinary growth of artemisias and other odoriferous plants is noticed by Fremont. They abound in the river bottoms and on the hills, growing to the height of 2 or 3 feet in tough, twisted, wiry clumps. A multitude of flowering plants abound in this region, among which prevail

several species of *helianthus* (sunflower), and in the month of September, when they are mostly in bloom, the whole country resembles a vast garden.—The prevailing rock formations of the several ranges are the metamorphic gneiss, granites, porphyries, and micaceous slates, the last named and talcose slates also being most common in the extreme W. ranges. Along the E. range they are flanked by the tertiary and cretaceous strata of the plains, which crop out in succession against the granitic masses of the mountains, and the latter were evidently uplifted with these, thus indicating that the elevation of the Rocky mountains was subsequent to the cretaceous period. The granites are very generally highly feldspathic, and in several of the ranges these and the other metamorphic rocks contain numerous metalliferous veins. Their production is particularly noticed in the articles CALIFORNIA, GOLD, and PIKE'S PEAK. (See also MERCURY, and SILVER.) In various parts of the chain coal beds are met with, and carboniferous limestones of later formation than the true coal measures. The coal appears to belong to these measures, and it is also found together with lignite of tertiary age; and such is believed to be the character of all the coal beds of the S. W. portions of the Rocky mountain chain. A locality is noticed in the article PETROLEUM, where bituminous coal and beds of sandstone are found associated with springs of rock oil. In the vicinity of Santa Fé bituminous coal and thick beds of black shales were examined by Mr. W. P. Blake, who referred them to the age of the true coal measures; and he was led to believe that important beds of coal might be discovered by exploring for them at various points N. and S. along the whole range of mountains through New Mexico and Kansas into Nebraska and beyond. Near the gold mines, 20 m. S. W. from Santa Fé toward Albuquerque, Mr. Blake also reports the occurrence of anthracite. The gold mines of this region range with those of Pike's peak, which are 800 m. further N.; but they were known and worked at a much earlier period, one deserted mine in the mountains, called Los Cerillos, having been opened, it is supposed, previous to 1680. The deposit mines of this region are on the slopes of subordinate or outlying ridges of the eastern ranges of the Rocky mountain chain, and are worked like the dry diggings of California. The gravel contains coarse gold, and is found from 20 to 60 and even 100 feet below the surface. The deposits are extensive and rich, but owing to lack of water are worked to great disadvantage. In the winter recourse is even had to snow, which is collected and melted by artificial heat; and at other times the gravel is transported to the nearest water courses. Many nuggets worth from \$50 to \$80 each have been found, and one valued at \$1,800, and another at \$2,000. The gold is fine, being rated at \$20 the ounce.

These deposits have been worked since 1828, and their yield has proved very variable, being estimated in 1847 to have amounted annually to from \$30,000 to \$250,000, since which time it has fallen off to a few hundred dollars. Beside occurring in deposits, the gold is also found in quartz veins, which have been worked to some extent. It is also noticed in one place in the unusual repository of stratified quartzose sandstone, supposed to be of the carboniferous period, and in great ferruginous beds belonging to the stratified formations. Silver ores are reported to occur near Albuquerque, and in Los Cerillos, 15 m. from Santa Fé. Mr. Blake examined several argentiferous veins in a porphyritic rock, the principal minerals being galena and blende with copper and iron pyrites. Valuable silver mines are worked near Franklin (El Paso), on the S. border of New Mexico. Rich copper ores are found, but not worked, in the mountains containing the gold mines, and native copper and the red oxide are met with near Jemez in the valley of the Rio Grande. Magnetic and specular iron ores of excellent character are found near Santa Fé in large quantities. An account of the variety of turquoise found in this region is given under *ONALCHINTL*. Of the mineral productions of the central region, the best known is the salt of Utah, for notices of which see *GREAT SALT LAKE*, and *SALT*. In Arizona near the Gila river are several mines containing rich argentiferous copper ores.

ROD. See *PERCH*.

RODENTIA, an order of mammals characterized by the chisel shape of the incisors, adapted for gnawing the hard vegetable substances upon which they principally feed, such as the wood and bark of trees, hard-shelled nuts, and occasionally bony structures like ivory. They correspond to the *glires* of Linnaeus, and the *premsiculantia* of Illiger; the ordinal name is derived from the Latin *rodeo*, to gnaw. Rodents are generally of small size, numerous in species, very prolific, and found in all parts of the globe. They are unguiculated, and in most the hind parts of the body and limbs exceed the front in length, so that they leap rather than walk, in some (as the jerboa) the disproportion being so great that they resemble the kangaroos in their mode of progression, which they also come near in many points of dentition and internal structure; they have no canines; the skull is small and flat, with the jaws, especially the lower one, strong; the snout is usually provided with long moustaches; the opening of the mouth is small, but the cheeks often form large pouches in which they convey food to their burrows; the legs are short in most, for walking or climbing, in the flying squirrels provided with a membrane extending from the sides, which answers the purpose of a parachute; many, like the beaver and muskrat, are excellent swimmers and divers; the thumb is never opposable, when pres-

ent; the skin is ordinarily covered with soft fur, but sometimes interspersed with bristles or spines; tail hairy, or naked and scaly. Few of them have been domesticated; the flesh of some is eaten, and the skin is often used for fur; though small, their numbers, gnawing habits, and disposition to hoard up food, render them in many instances very great pests.—The order comprises such animals as the capibara, beaver, porcupine, squirrel, marmot, dormouse, rat, hamster, lemming, jerboa, hare, rabbit, muskrat, Guinea pig, agouti, and chinchilla. Wagler divides them into *leporina* or hares, *caviina* or cavies, *hystricina* or porcupines, *castorina* or beavers, *murina* or rats, *psammoryctina* or sand rats, *georhychi* or *cunicularia* or mole rats, *chinchillina* or chinchillas, *dipoda* or jerboas, *myozina* or dormice, and *sciurina* or squirrels. Waterhouse divides them into the 5 families of *leporida*, *hystricida*, *murida*, *sciurida*, and *sacomyzida*, all represented in North America, and the last peculiar to it. No indigenous rodent is common to Europe and North America, unless in the questionable instances of the beaver and Parry's spermophile; and the North American species do not extend to South America. Rodents form nearly  $\frac{1}{4}$  of all mammals, and in North America  $\frac{1}{4}$  of all the land mammals, this last containing about  $\frac{1}{2}$  of all the described species; of the squirrels, nearly  $\frac{1}{4}$  of all known species are found within the limits of the United States; the pouched rats are entirely American; of the rat family, the field mice are best represented in North America; of the porcupine family, more than  $\frac{1}{4}$  are South American, the capibara, the largest living rodent, being among them, itself greatly surpassed in size by the extinct *castorides Ohioensis* of North America; while many species of hares are found in North America, only one is met with in South America.—The glenoid cavity is longitudinal in direction; the interparietal is frequently a distinct bone even in adults, the intermaxillaries greatly developed, anterior orbital opening large, and the orbits lateral, often very large and not entirely separated from the temporal fossæ, the latter being in many very small; the intermaxillaries accommodating the upper incisors, the maxillaries are pushed very far back, and form a large part of the inner wall of the orbit, the palate bone entering into it slightly, if at all; the nasal bones are so long that the opening of the nose is generally very near the end of the snout; the upper lip is either distinctly cleft, with a small naked muffle, divided by a vertical groove separating the nostrils, as in the rats and squirrels; or the muzzle is obtuse, as in the porcupine, with the muffle clothed with fine velvety hairs, the upper lip rarely cleft, and with seldom any groove between the nostrils. The usual number of dorsal vertebrae is 13, in some there being 12 or 14, of the lumbar 6 or 7, and of the sacral 4; the clavicles are almost always present, but are very small in the hares and absent in the cavies; the

bones of the forearm are close together, but rarely ankylosed; the fore feet have almost always 4 well developed toes, with a rudimentary inner one or thumb, and are commonly used like hands; the bones of the wrist are distinct, with the *os magnum* generally divided; the tibia and fibula are distinct in many, but in rats and hares are joined; the hind feet are usually 5-toed, but sometimes with 4 or 3, and occasionally with a supernumerary bone on the inner side of the tarsus. The incisors, except in the hare family (where there are 4 upper ones), are 2 in each jaw, so acting upon each other that their opposing surfaces keep the edges always sharp; they are covered with enamel only on the anterior surface, secreted by the membrane lining the anterior wall of the socket, the wearing away of the softer posterior portion keeping the chisel edge; in the burrowing genera they are wider than deep, doubtless to cut off roots which would otherwise be in the way of their excavations; those of the upper jaw are always shorter than the lower, and usually describe  $\frac{1}{2}$  of a circle, the longer ones of the lower jaw forming a smaller segment of a larger circle, the part within the socket (which is by far the longest) being of course taken into the account; the sockets of the latter extend below or on the inner side of the molars to the back part of the jaw; as they are worn away at the tip, additional dental matter is supplied at the base, pushing them forward and keeping them of uniform length; the lower incisors sometimes move independently of each other, from the non-consolidation of the symphysis; deciduous incisors are found only in the hare family. That these teeth are kept sharp and of proper length by attrition against each other is proved by their enormous growth when an opposing tooth has been lost by accident; the growth follows the natural curve of the incisor, so that it returns to some portion of the head, piercing skin, muscles, and bone, rendering mastication impossible, and the animal perishes of starvation. The incisors are separated by a considerable space from the molars, so that they are not adapted for seizing or tearing living prey, though not a few of the order (as the rats) exhibit decided carnivorous propensities; the act of gnawing is facilitated by the longitudinal condyle of the lower jaw, permitting motion forward and backward, but not from side to side in most cases. The incisors vary in color from whitish to bright orange and reddish brown; they are generally smooth, but in some are longitudinally grooved. Eight is the smallest number of the molar teeth, viz., in the Australian water rat (*hydromys*); in the rats the normal number is  $\frac{3}{2}$ - $\frac{3}{2}$ , though this is not constant; in the porcupines there are always  $\frac{4}{2}$ - $\frac{4}{2}$ ; in most squirrels an extra small tooth occurs in advance of the rows of the upper jaw, deciduous in the adults; and the greatest number in the order is in the hares,  $\frac{5}{2}$ - $\frac{5}{2}$ . The molars may be either rooted or root-

less, in the former case ceasing to grow after a certain period, or when the animal reaches maturity, in the latter, like the incisors, continuing to increase from the base as they are worn away at the crown; in the squirrels and rats, which have rooted molars, subsisting on oily nuts, flesh, and similar soft food, their abrasion is less rapid, and less depth of crown is needed, and this is firmly implanted; in the beaver, porcupine, and agouti, living on coarser vegetable food, their roots are incomplete, the crowns are more rapidly worn, and the growth is effected from the matrix at the base during a considerable period of the animal's life, the teeth being implanted, like incisors, by an undivided continuation of the crown; in the hares and cavies the molars are rootless, and growth continues during life, they being more or less curved, and the sockets sometimes open at the base. The molars are formed principally of dentine, the harder enamel making loops or penetrating folds, and sometimes an outer layer; external to the enamel is the cement, entering but little into the structure of the rooted molars, but filling the interstices between the enamel folds in the rootless ones, and binding the different parts together; the crowns are flattened, the transverse folds of enamel constituting generic distinctions; in the frugivorous genera the crown is very flat, in the omnivorous divided into blunt tubercles, and in the carnivorous studded with points. All molars beyond 8 on each side of each jaw are premolars, which have replaced deciduous or milk teeth. The stomach has generally the transverse diameter greater than the vertical, the oesophagus usually entering near the middle of the upper surface, the pyloric separated from the cardiac portion by a more or less strongly marked constriction; the intestinal canal is generally very long, divided into small and large, the latter sometimes longer than the former and hardly exceeding them in width; the cæcum is often very large, and divided by numerous septa; it is wanting in the dormouse. The liver is very large, with the usual 5 principal lobes, the gall bladder wanting in the rat family; the pancreas is also very large, and generally divided into 2 portions; the spleen occupies its usual position. In the species which hibernate, the vertebral artery is considerably larger than the internal carotid, the basilar artery forming the greater part of the circle of Willis and giving off the cerebral arteries; the external jugular vein receives the principal portion of the blood from the brain, and the vertebral vein communicates with it; this disposition of the veins, however, is found in non-hibernating rodents and in other orders of mammals, and is, according to Cuvier, a provision connected rather with the dependent position of the head than with hibernation. The brain is small, and in the feeble and strictly herbivorous species resembles that of birds; the cerebral hemispheres are broad behind, gradually tapering forward, but in the larger ones more nearly circular as in car-

nivora; there is an almost entire absence of convolutions, the order belonging to the *lissencephala* of Owen (see MAMMALIA); the cerebellum is moderate, and scarcely at all covered by the posterior lobes of the cerebrum; the *tubercula quadrigemina* are very large, the anterior the larger; the characters of the brain place the rodents next above the marsupials.—This order is generally considered as displaying very little intelligence, though manifesting (as the beaver) some of the most remarkable instincts; but the rat certainly shows an adaptation of means to ends, under circumstances often the most unnatural and unexpected, which makes it hard to draw the line between animal instinct and intelligence. There is in many an extraordinary development of the sexual appendages, some of which are very complex and peculiar to the order; the testes are generally larger than the kidneys, and in most are not contained in a scrotum, but beneath the skin of the perineum; the intromittent organ is variously directed, with an internal bone, and in some armed with a formidable apparatus of horns, spines, and serrations; the preputial glands are often largely developed, secreting in the beaver the drug *castoreum*, once much used as an antispasmodic; the uterus is 2-horned; the mammary glands vary from 4 in the Guinea pig to 12 or 14 in the agouti. Rodents have existed from the earliest tertiary epoch, presenting genera sometimes different from, and sometimes the same as the present.

RODGERS, JOHN, an officer of the U. S. navy, born in Maryland in 1771, died in Philadelphia in Aug. 1838. He entered the navy as a lieutenant, March 9, 1798, and was the executive officer of the frigate *Constellation*, the flag ship of Commodore Truxtun, when she captured the French frigate *L'Insurgente* off Nevis, Feb. 9, 1799. The French ship was taken possession of by Lieut. Rodgers, who soon found himself in a very critical position. Her decks were covered with wreck as well as with dead and wounded, and the prisoners were inclined to rise. A gale separated the ships, and he was compelled to manage the frigate and watch the prisoners with a very weak prize crew for 3 days, when he rejoined the *Constellation* in the harbor of St. Christopher. In March, 1799, he was made a captain, and appointed to the *Maryland*, 20, in which ship he made a cruise upon the West India station. In 1803 he was appointed to the *John Adams*, 28, attached to the Mediterranean squadron, which at that time had commenced operations against Tripoli. In June, 1803, Capt. Rodgers, in the *John Adams*, in company with the *Enterprise*, 12, successfully attacked a Tripolitan cruiser of 22 guns and several gun boats at anchor in a bay near Tripoli. In 1804 Capt. Rodgers commanded the frigate *Congress*, 38, in the squadron employed against Tripoli under Commodore Barron, whom in 1805 he succeeded in the command. After the diplomatic settlement with Tripoli, he proceeded with his squadron to Tunis, where

he remained over a month, engaged in negotiations which resulted in the establishment of friendly relations. A demand made by the Tunisian minister for tribute was promptly denied. In the spring of 1811, while lying off Annapolis in his flag ship, the *President*, 44, Capt. Ludlow, Com. Rodgers received intelligence that a seaman had been impressed from an American brig off Sandy Hook by an English frigate. He sailed for that point without delay, and on May 16, when a few leagues to the southward of New York, discovered a vessel of war, and immediately gave chase to her, the *President* showing American colors. About 8½ P. M. she came up with the stranger, and hailed, making the usual inquiry: "What ship is that?" to which no answer was given; but, after a little delay, the same inquiry was made from her, followed by a shot, which entered the *President's* mainmast. An engagement ensued, which lasted but a short time, when it was evident that the antagonist of the *President* was the weaker ship, and was much crippled. The *President* therefore ceased her fire, and hailing again, was answered by the stranger that she was a "British ship of war." Com. Rodgers now gave the name of his own ship, and showing lights remained near the other until daylight, when she was boarded and discovered to be H. B. M. ship *Little Belt*, of 23 guns, Capt. Bingham. She had suffered severely, 81 of her crew having been killed and wounded, and the ship much cut up. She declined receiving assistance, and the ships parted. The accounts given by the two commanders of this affair differed materially, particularly as to the firing of the first gun, and it widened the breach which already existed between the two nations. On June 21, 1812, within an hour after receiving official intelligence of the declaration of war by the United States against Great Britain, Com. Rodgers sailed from New York in command of a squadron consisting of the *President*, which still bore his flag, the *United States*, 44, *Congress*, 38, *Hornet*, 18, and *Argus*, 16. The squadron ran off to the S. E., and on June 23 a British frigate was discovered, to which a general chase was given. The *President* was much the fastest ship of the squadron, and at 4 P. M. was within gun-shot astern of the English ship, when a running fight took place, in the course of which one of the forward main deck guns of the *President* burst, killing and wounding 16, Com. Rodgers being among the wounded. Soon afterward the British commander commenced lightening his ship of her boats, spars, anchors, water, &c. As Com. Rodgers found it impossible to come up with her without doing the same, and thereby breaking up his cruise, the pursuit was abandoned. It was afterward ascertained that the ship chased was the *Belvidera*, 36, Capt. Byron, which suffered severely aloft and had 7 killed and wounded, Capt. Byron among the latter. The loss of the *President* was 22 killed and wounded. Com. Rodgers extended this

cruise nearly to the entrance of the British channel, thence to Madeira, and thence to Boston by way of the Azores and Grand Banks. It occupied about 70 days, and the result was the capture of 7 British merchantmen, and the recapture of one American. Com. Rodgers made other cruises in the *President* during the war, but the British packet *Swallow*, with a large amount of specie on board, and the schooner *Highflyer*, were the only government vessels captured by him. No vessels of war were ever seen by him except in squadron or under circumstances that prevented an engagement, though he completely ran the gauntlet among British cruisers, particularly in a cruise to the West Indies and along the American coast in 1814. In June, 1814, he was appointed to the new frigate *Guerriere*, and rendered important services in the defence of Baltimore. From April, 1815, to Dec. 1824, he served as president of the board of navy commissioners, and from 1824 to 1827 in command of the squadron in the Mediterranean. On his return from this command he was again appointed to the board of navy commissioners, which he relinquished in 1837 in consequence of declining health. At his death he had long been senior officer of the navy.

RODNEY, CÆSAR, a signer of the declaration of independence, born in Dover, Del., about 1730, died in 1783. His father came to America with William Penn, and settled in Kent county upon the Delaware, and from him the son inherited a large estate. In 1762, and perhaps before, he was a member from his native county of the assembly which met in New Castle. In 1765 he was one of the committee of three sent by the legislature to the provincial congress which met at New York, to adopt measures in consequence of the stamp act and other oppressive acts of the British parliament. During the following sessions he warmly supported the prohibition of the importation of slaves into the province, and in 1769 was chosen speaker. He was also chairman of the committee of correspondence with the other colonies, and in 1774, by his authority as speaker, called a meeting of the legislature, by which body he was selected as one of the 3 delegates to the continental congress to be held in Philadelphia. He was reelected to the congress of the following year, and while absent at Philadelphia was also made brigadier-general. As all the counties in Delaware were not yet prepared for so decisive a step as the separation from the mother country, he made a tour through the lower portion of the province, in order to reconcile the people to the inevitable change of government, and to prepare for the coming war. While he was absent the question of independence was under discussion, and his two colleagues, McKean and Read, were divided in opinion, the former being favorable and the latter opposed to the declaration. As Rodney did not arrive, McKean sent a special messenger to him in great haste, and the former

by great exertion managed to reach Philadelphia just as the vote was being taken, entering the hall with the spurs on his boots. When, in the autumn of the year, a convention of the people of Delaware was called for the purpose of framing a new constitution and electing delegates to the new congress, the loyalists and the moderate war party had a majority, and Rodney was rejected. He went subsequently to the army, commanding the Delaware line in his rank of brigadier-general; and as he still continued a member of the council of safety and of the committee of inspection, in those capacities he contributed much to the success of the revolutionary cause. In 1777 he was chosen president of the state of Delaware, in which position he remained 4 years, declining a reelection in 1782. He was immediately made a delegate to congress, but it does not appear that he ever took his seat.

RODNEY, GEORGE BRYDGES, baron, an English admiral, born at Walton-upon-Thames, Surrey, Feb. 19, 1718, died in London, May 21, 1792. He was sent to Harrow school, but at 12 years of age was taken from it and sent to sea; in 1739 he became a lieutenant, in 1742 a captain, and in 1748 was sent to the Newfoundland station as governor and commander-in-chief. In 1752 he returned to England, was elected to parliament from the borough of Saltash, and was engaged in active service until 1759, when he was created rear admiral. In 1761 he was appointed commander-in-chief at Barbados and the Leeward islands, and reduced the islands of Martinique, Santa Lucia, and Grenada, but the conclusion of a peace led to his recall in 1763. In 1762 he had been made vice-admiral in reward for his services; and in Jan. 1764, he was created a baronet. In 1765 he was made master of Greenwich hospital; in 1768 was returned to parliament from Northampton, after a severe contest; in Oct. 1770, was made vice-admiral of the white, and in Oct. 1771, vice-admiral of the red. He resigned his governorship of Greenwich hospital in 1771, on being appointed commander-in-chief at Jamaica. In 1774 he returned to England, but his circumstances becoming embarrassed, he was obliged to seek refuge from his creditors in France. Here it is reported that, on the breaking out of the war between England and France, he received an offer through the duke de Biron of high rank in the French naval service, to which he replied: "It is true, monsieur le duc, that my distresses have driven me from my country, but no temptation can estrange me from her service. Had this offer been voluntary on your part, I should have considered it an insult; but I am glad that it proceeds from a source that can do no wrong." Finally he obtained money sufficient to pay his debts, and, having been made admiral of the white, sailed in 1779 for the Barbados station, where he had been again appointed commander-in-chief. His squadron consisted of 22 ships of the line and 8 frigates, and after having captured a number of



Spanish transports and ships of war, he fell in with a Spanish fleet off Cape St. Vincent in Jan. 1780, under Don Juan de Langara. This consisted of 11 ships of the line and 2 frigates, and of these 7 were taken or destroyed, the rest being saved by the darkness of the night and the storminess of the weather. On April 17, 1780, he came up with the French fleet near Martinique under the count de Guichen, but was prevented from capturing any of their vessels by the refusal of his captains to follow. As it was, with a portion of his squadron he broke through the enemy's lines, and was rewarded with the thanks of both houses of parliament, and a pension of £2,000. The same year he was elected to the house of commons from Westminster, and made a K. B. In Dec. 1780, he made an unsuccessful attack upon St. Vincent. War breaking out between Great Britain and Holland, he took the Dutch island of St. Eustatius without firing a shot, but treated the inhabitants in such a manner as to draw upon himself much censure. Afterward Demerara, Essequibo, and Berbice were reduced; and in the autumn of 1781 Rodney returned to England, where he was received with great honor, created vice-admiral of England, and assigned the command of the whole West Indies. Returning thither, he went in pursuit of the French fleet under the count de Grasse, which was intending to form a junction with the Spanish and attack Jamaica. A partial action took place on April 9, 1782, but it was not until April 12 that the two squadrons had a general engagement. The battle began at 7 o'clock in the morning, and lasted till 6½ in the evening, and the British succeeded in taking 7 ships of the line and 2 frigates. One of the vessels taken was the French flag ship, the *Ville de Paris*. The whigs meanwhile had come into office, and as Rodney was opposed to that political party, an officer was sent to supersede him; when, however, the news of his victory reached England, an express was sent to bring back his successor, but failed to reach him. Rodney arrived in England, Sept. 21, 1782, and for his services received the thanks of both houses of parliament and an additional pension of £2,000, and was moreover raised to the peerage with the title of Baron Rodney of Rodney Stoke in Somersetshire.—See Mundy's "Life and Correspondence of Lord Rodney" (3 vols. 8vo., London, 1830).

RODRIGUE, ISLAND OF. See MAURITIUS, vol. xi. p. 298.

ROE, AZEL STEVENS, an American novelist, born in the city of New York in 1798. Having received an academic education, he became a clerk in a mercantile house in New York, after a time commenced business on his own account as a wine merchant, and finally retired from business and settled at Windsor, Conn., where he has since resided. For some years he amused his leisure by writing tales for the perusal of his friends and of a literary circle to which he belonged, but with no de-

sign of publication until most of his property was lost through the failure of persons whose notes he had freely indorsed. His works, marked by great simplicity and naturalness, and of a highly practical character, have proved very popular, and in England especially have met with a large sale. They include "James Montjoy, or I've been Thinking" (New York, 1850); "To Love and to be Loved" (1852); "Time and Tide, or Strive and Win" (1852); "A Long Look Ahead" (1855); "The Star and the Cloud" (1856); "True to the Last" (1859); and "How Could He Help It?" (1860).

ROEBUCK, a small European deer of the genus *capreolus* (H. Smith), the *C. caprea* (Gray), and the *chevreuil* of the French. The horns are small, nearly erect, cylindrical, slightly branched, with a very short peduncle and 3 short branches; the skull has a very small, shallow suborbital pit; the muffle broad and naked; tear bag indistinct, hoofs narrow and triangular, and a tuft of hair rather above the middle of the metatarsus. The color in summer is reddish brown, in winter olive with paler shades; inside of the ears fulvous, and a black spot at the angles of the mouth; the tail is short, and the anal disk is large and white; the hair in winter is thick and harsh, and in summer thinner and more flexible. It is about 4 feet long, 2½ feet high at the shoulder and 2½ behind. It is one of the most graceful and active of the deer family, frequenting the woods and copses of the rocky regions of Europe from the Scottish highlands to the Tyrol, but in less wild districts than the stag. Its agility and speed are astonishing, 20 feet being sometimes cleared at a single bound. They are not polygamous, and a pair generally has 2 young at a birth, which are treated with the utmost tenderness by both parents, and often remain attached to each other after quitting the old ones; they congregate in small families, but not in herds, feeding on herbage and the buds and tender shoots of trees, from the latter habit often doing much mischief in a forest. The flesh is considered better than that of the stag when properly killed. The horns are used for knife handles, &c.; they are dropped after the breeding season in November, and are reproduced during the winter. The period of gestation is 5 months. From their strong scent they are easily hunted, though they frequently escape by their speed, doublings, springing to cover, and other artifices to baffle the hounds. In northern Asia is found the ahu or Tartarian roebuck (*C. pygargus*, Sundev.); this is a larger animal, with longer and more prickly horns, and coarser and longer hair; the color is brownish above and yellowish below; there is no tail. The roebucks are represented in North America by the Virginia deer (*cariacus*, Gray), and in South America by the brockets (*coassus*, Gray).

ROEBUCK, JOHN ARTHUR, an English politician, born at Madras in Dec. 1802. From 1815 to 1824 he resided in Canada. Then going to

London, he studied law, and in 1832 was admitted as a barrister, and in the same year elected by the constituency of Bath to parliament, where he soon became prominent as a radical reformer. In 1835 he was appointed agent for the assembly of Lower Canada during the contest between that house and the executive. He soon after published a series of political pamphlets, which involved him in a bloodless duel with the editor of the "Morning Chronicle," Nov. 19, 1835. In 1837 he lost his seat in parliament in consequence of his attack upon the whigs, but was reelected in 1841. In 1847 he was defeated again, and in 1849 was elected for Sheffield, which he now represents. On Jan. 29, 1855, the passage of his motion to inquire into the state of the army in the Crimea caused the resignation of the Aberdeen ministry; and he was chairman of the committee subsequently appointed for that purpose, and also of the short-lived "Administrative Reform Association," organized in 1856. Beside contributions to the reviews, he is the author of "The Colonies of England" (1849), and of a "History of the Whig Ministry" (1852).

ROGATION DAYS (Lat. *rogo*, to ask), in the ecclesiastical calendar, the Monday, Tuesday, and Wednesday immediately preceding Ascension day. They derive their name from the custom of offering on these days supplications or litanies, called rogations, for a blessing upon the fruits of the earth, or as a preparation for the devout observance of Ascension day. In the primitive church these rogations were made by the bishop or some of the clergy, accompanied by the people, in the open fields. Mammertus, bishop of Vienne, who flourished in the latter half of the 5th century, was the first to establish the custom, which is still followed in many parts of Europe. In cities and towns of England perambulations of the parish boundaries by the minister, accompanied by his church wardens and the people, are practised on rogation days.

ROGER I., count of Sicily, 12th son of Tancred de Hauteville, born in Normandy in 1031, died in Mileto, Calabria, June 22, 1101. Following his brothers into southern Italy in 1058, he undertook, in conjunction with his brother Robert Guiscard, the conquest of Calabria, and afterward that of Sicily, which the Saracens had held for two centuries. In 1060 he took Messina, and in 1061 defeated the Saracens at Enna with great slaughter. A disagreement between Roger and Robert now took place, owing to the refusal of the latter to divide the country they had jointly conquered; but it was settled in 1071 by the acknowledgment of Roger as count of Sicily. It was not however till 1074 that he came into possession of the entire island, by the conquest of the two capitals, Catania and Palermo. In 1085, on the death of Robert, he became chief of the Normans in Italy, and took the title of grand count. In 1090 he subdued Malta. He established his nephew the son of Robert in Apulia,

and gave his own attention to the improvement of Sicily, establishing Christianity throughout the island in 1096, but allowing to his Saracen subjects liberty of conscience. In 1098 the pope, Urban II., made him apostolic legate.

ROGER II., 1st king of Sicily, son of the preceding, born in Mileto, Calabria, in 1093, died Feb. 26, 1154. He succeeded his father under the guardianship of his mother, Adelaide of Montferrat. On assuming the government, Roger reduced the barons to obedience, and brought Malta, which had revolted, back to allegiance. He attacked his cousin William, duke of Apulia and Calabria, in 1121, on whose death in 1127 he inherited his dominions in southern Italy. In 1180 he sustained his brother-in-law Anacletus as anti-pope, from whom he received the title of king of Sicily, and was crowned at Palermo the same year. In 1187 he was defeated by the German emperor Lothaire II., who fought on the side of Pope Innocent II., and in 1139 was excommunicated by the pope; but subsequently a reconciliation took place, and he was confirmed by the pope in his new kingdom. He took Naples from Duke Sergius II., and Capua and Aversa from Prince Robert II.; and he had another quarrel with the pope, which was settled in 1146. In consequence of insults received from the Greek emperor Manuel Comnenus in 1146, he ravaged Epirus and Dalmatia, captured Corfu, and devastated Greece. In 1147 he attacked the empire of the Zoraides in Africa, and extended his sway over a large part of the Barbary coast. He introduced the sugar cane and the silk culture into Sicily.

ROGER, GUSTAVE HIPPOLYTE, a French singer, born in Paris, Aug. 27, 1815. He entered the *conservatoire* in 1837, and, having gained the first prize for singing and declamation, appeared in 1838 at the *opéra comique*, where for 10 years he took the principal tenor parts in the operas of Halévy and Auber. In 1849 he appeared at the *académie* in Meyerbeer's *Prophète*, and thenceforth sang with great success in serious opera. In Germany at different times he has created much enthusiasm. He is still a favorite singer on the French stage.

ROGERS, HENRY, an English clergyman and author, born about 1814. He studied at Highbury college, and for some years was pastor of an Independent church, but resigned on account of his health. In 1839 he became professor of the English language and literature in University college, London, but gave up this position on being chosen professor of philosophy in Spring Hill Independent college, Birmingham, which office he held till 1858, when he accepted the presidency of the Lancashire Independent college, Manchester. He is a contributor to the "Edinburgh Review," and a collection of his articles, under the title of "Essays selected from Contributions to the Edinburgh Review" (2 vols. 8vo., Edinburgh, 1850), with an additional volume in 1855, gave him a wide popularity. He has also written

the "Life and Character of John Howe, M.A., with an Analysis of his Writings" (1836); a "General Introduction to a Course of Lectures on English Grammar and Composition" (1838); and "The Eclipse of Faith" (1853), a work which was replied to by Prof. F. W. Newman, to whose criticism Mr. Rogers rejoined in a "Defence" (1854).

**ROGERS. I. JAMES BLYTHE, M.D.**, an American chemist and physician, eldest son of Dr. P. K. Rogers, a physician in Philadelphia, and afterward professor in William and Mary college, Va., born in Philadelphia in 1803, died there, June 15, 1852. He was graduated M.D. at the university of Maryland, became a few years after professor of chemistry in Washington medical college, Baltimore, and was subsequently called to the chair of chemistry in the medical college of Cincinnati. Removing to Philadelphia, he became professor of chemistry in the Franklin medical school of that city, and on the resignation of Prof. Robert Hare, in 1847, was appointed to the chair of chemistry in the university of Pennsylvania. For several years he was employed during his vacations as chemical and geological assistant in the surveys of Virginia and Pennsylvania. He published several interesting and original papers in the scientific journals, and was one of the editors of the last American reprint of Turner's "Chemistry." **II. WILLIAM BARTON**, an American physicist and geologist, brother of the preceding, born in Philadelphia in 1805. He first lectured on science in the Maryland institute in 1827, and in the following year succeeded his father in the chair of natural philosophy and chemistry in William and Mary college, where he remained until 1835. He was then appointed professor of natural philosophy in the university of Virginia, and enlarging his course by the addition of geology, he continued to occupy it till 1853, when he removed to Boston, where he has since resided. He began his geological labors by an examination of the region of the mineral springs of Virginia, and especially by an analysis of their waters; and in 1835 he organized the state geological survey, at the head of which he remained till it was discontinued in 1842. Beside the annual reports of the geology of Virginia, he is the author of a short treatise on the "Strength of Materials" (Charlottesville, 1838); of "Elements of Mechanical Philosophy" (Boston, 1852); and of numerous papers containing original researches in geology, experimental physics, and chemistry, which have appeared in the "American Journal of Science," the Edinburgh "New Philosophical Journal," the London "Philosophical Magazine," the "Transactions" of the American association for the advancement of science and of the British association, of the Boston academy of arts and sciences, of the Boston society of natural history, of the Philadelphia academy of sciences, and of the American philosophical society. He is a zealous promoter of scientific

education among the industrial classes, and has recently given his views of the organization of an institute of technology and school of industrial science, in a report prepared for a committee of which he is chairman. **III. HENRY DARWIN**, an American geologist, brother of the preceding, born in Philadelphia in 1809, became professor of physical sciences in Dickinson college, Carlisle, in 1831, and afterward professor of geology in the university of Pennsylvania, which office he held for many years. He began his active geological labors with the survey of the state of New Jersey, and in 1835 published a report and geological map of the state. He then entered on his great work, the survey of Pennsylvania, in which, with some interruptions, he was occupied until 1856, publishing during the first years annual reports of progress which make together a large 8vo. volume. His final report on the geology of Pennsylvania, in two large vols. 4to., with numerous drawings and illustrations, and an atlas of geological maps, executed by A. Keith Johnston (Edinburgh, 1858), is recognized as a work of great thoroughness and originality, especially in the departments of structural and dynamic geology, and ranks in scientific as well as practical value with the labors of the first geologists of the age. In 1857 he was appointed regius professor of geology and natural history in the university of Glasgow, Scotland, where he has since lived. For some years previous to this appointment he was a resident of Boston. Prof. Rogers has contributed many important papers on geological and other scientific subjects to the "Transactions" of the American philosophical society, the Boston society of natural history, the American association of science, the British association of science, the Philadelphia academy of science, the "American Journal of Science," and the Edinburgh "New Philosophical Journal," of which last he is one of the editors. He is the author of a geological map of the United States, and a chart of the arctic regions in the "Physical Atlas," and in conjunction with W. and A. K. Johnston of Edinburgh has published a geographical atlas of the United States. **IV. ROBERT EMPIE**, an American chemist and physician, brother of the preceding, born in Baltimore in 1814, was graduated M.D. at the university of Pennsylvania, when he presented an experimental essay on endosmose, which was published by request of the faculty. In 1844 he was appointed to the chair of chemistry in the university of Virginia, which he continued to hold until 1852, when he succeeded his brother Prof. J. B. Rogers as professor of chemistry in the university of Pennsylvania. For some years he acted as occasional assistant in the geological surveys of Virginia and Pennsylvania. Beside being the author of various contributions on chemical subjects published in scientific journals, he was associated with his brother Prof. J. B. Rogers in preparing the amended edition of Turner's "Chemistry," and

has since edited the American reprint of Lehmann's "Physiological Chemistry." He has been for several years dean of the medical faculty of the university of Pennsylvania.

ROGERS, JOHN, an English clergyman, born about 1500, burned at Smithfield, Feb. 4, 1555. He was educated at Cambridge, entered into holy orders there, and was subsequently chaplain to the English factory at Antwerp, where he remained for several years. There he became acquainted with Tyndale and Coverdale, and assisted them in translating the Scriptures into English, the edition being published in 1537. Rogers translated the Apocrypha, and corrected the whole for the press. From Antwerp he went to Wittenberg, where he was pastor of a Dutch congregation. On the accession of Edward VI. Bishop Ridley invited him home, and made him prebendary and divinity reader of St. Paul's. On the Sunday after the triumphal entry of Queen Mary into London, in Aug. 1553, Rogers preached a sermon at St. Paul's cross, in which he exhorted the people to adhere to the doctrine taught in King Edward's days, and to resist the forms and dogmas of Catholicism. He was summoned before the privy council for this, but defended himself ably, and was released. On Aug. 18, 1553, however, he was ordered to remain a prisoner in his own house, and was at the end of 6 months removed to Newgate. He was tried in Jan. 1555, before Gardiner, bishop of Winchester, and condemned to be burned, which sentence was carried into execution in February. He was the author of a number of theological works. Several of his grandchildren removed to the American colonies, and there are now some hundreds of persons in the United States who claim descent from him.

ROGERS, SAMUEL, an English poet, born at Newington Green, near London, July 30, 1763, died in London, Dec. 18, 1855. His father, an influential dissenter and a banker by profession, gave him a careful private education, and took him while a boy into his banking house, preparatory to his becoming a partner. Young Rogers, whose earliest ambition was to be a preacher, became in his 18th year a prose contributor to the "Gentleman's Magazine," and in 1786 made his first appearance as a poet in a thin quarto entitled "An Ode to Superstition, with some other Poems," of which during the next 4 years only about 20 copies were sold. In 1792 he produced his "Pleasures of Memory," which at once gave him a place among the poets of England. The death of his father in 1793 left him in the possession of an ample fortune, and he soon after retired from active participation in business. In 1798 appeared his "Epistle to a Friend, and other Poems;" and in 1803 he established himself in a house (No. 22) in St. James's place, which during the next half century enjoyed a wide celebrity as a resort of literary men, and the receptacle of choice treasures of art. Rogers's "breakfasts," given in a shady apart-

ment, which Sydney Smith described as "a place of darkness where shall be gnashing of teeth," became in time famous as a sort of social rallying point; and it is said that, during the London season, scarcely a day passed in which from 4 to 6 persons did not assemble at his hospitable board. Among these were Fox, Erskine, Grattan, Sheridan, Mackintosh, Wellington, Byron, Moore, Campbell, Mme. de Staël, Scott, Wordsworth, Sydney Smith, Washington Irving, and Coleridge, all of whom except Irving the host survived. His collection of pictures by ancient and modern artists was distinguished by its exquisite taste; his books, autographs, gems, vases, and antiques of all descriptions, were selected with equal judgment; and the whole collection realized after his death upward of £50,000, a sum considerably larger than the original cost. Rogers made his next appearance as a poet in 1812 in the "Voyage of Columbus," printed at the end of a new edition of his poems, with illustrations by Stothard. In 1813 Byron inscribed to him his "Giaour," "as a slight but most sincere token of admiration for his genius, respect for his character, and gratitude for his friendship;" and in the succeeding year the poets appeared in a joint volume, containing the "Lara" of Byron and Rogers's "Jacqueline." His next publication was a poem in blank verse entitled "Human Life" (1819), followed in 1822 by "Italy," his longest and by many esteemed his best work. His poetic labors may be said to end here, although he subsequently tried his hand in an occasional copy of verses or couplet, and the remainder of his literary life was devoted to the publication of illustrated editions of his "Italy" and his "Poems," the designs for which were furnished by Turner and Stothard, and were engraved by the first artists in England. He is said to have expended between £10,000 and £15,000 in this undertaking, which however proved remunerative. Upon the death of Wordsworth he was offered the poet laureateship, which, in consideration of his great age, he declined. He retained his physical vigor until near the close of his long life, when his faculties, both mental and physical, became impaired. According to his own statement, he was engaged on the "Pleasures of Memory" for 9 years; on "Human Life" for nearly the same space of time; and "Italy" was not completed in less than 16 years. Byron declared that there was not a "vulgar line" in his "Pleasures of Memory;" but it is doubtful if his poems would now be read were it not for their pictorial embellishments. His chief personal blemish was a tendency to ill-natured satire and unreasonable antipathies. Of this and other traits some idea may be obtained from the volumes of his "Table Talk," published by his nephew William Sharpe and the Rev. Alexander Dyce.

ROGERS, WILLIAM, D.D., an American clergyman, born in Newport, R. I., July 22, 1751,

died in Philadelphia, April 7, 1824. He was graduated at Rhode Island college (now Brown university) in 1768, and at the age of 20 was licensed as a Baptist preacher. From 1772 to 1775 he was pastor of the 1st Baptist church in Philadelphia, in 1776 was appointed by the general assembly of Pennsylvania chaplain of the Pennsylvania forces, and in 1778 was promoted to a brigade chaplaincy in the continental army. In 1781 he retired from the military service, and, though called to the pastorate by churches of 3 different denominations, preferred rather to supply destitute churches in the vicinity of Philadelphia. In 1789 he was appointed professor of English and oratory in the college and academy of Philadelphia, and in 1792 was elected to the same chair in the university of Pennsylvania, which post he held for 20 years. In 1803 he became the "stated supply" of the 1st Baptist church in Philadelphia, and continued his services there for two years. In 1816 and 1817 he was a member of the general assembly of Pennsylvania from Philadelphia. He was an officer and active manager of the gradual abolition societies of Pennsylvania and Maryland, of the prison society of Philadelphia, &c. His published works include several sermons, addresses, and prayers delivered on special occasions, a circular letter on justification (1785), and one on Christian missions.

ROGET, PETER MARK, an English physiologist and author, born in London in 1779. He studied medicine at the university of Edinburgh, where he was graduated in 1798, and after a tour to the continent settled in 1804 in Manchester, where he was appointed physician to the infirmary, lunatic asylum, and fever hospital. In 1808 he went to London, where he engaged in the formation of the northern dispensary. He was for many years secretary of the royal society, was a member of the senate of the university of London, and for years one of the examiners in physiology, and was one of the Fullerian lecturers on physiology at the royal institution. He was the author of one of the Bridgewater treatises, entitled "Animal and Vegetable Physiology" (1834). He has also written extensively on mathematics, electricity, galvanism, magnetism, and electro-magnetism. His last publication is the "Thesaurus of English Words and Phrases" (9th ed., 1860).

ROHAN, LOUIS RENÉ EDOUARD, prince of, a French cardinal, born Sept. 23, 1734, died in Ettenheim, Feb. 16, 1803. He was destined for the church, and became while very young the associate of his uncle the bishop of Strasbourg. In 1772 he was ambassador from Louis XV. to Vienna, was recalled in 1774 on account of his giving offence to the empress by scandalous luxury and political meddling, and appointed on his return to various places of distinction and emolument. In 1779 he was made bishop of Strasbourg, and at length cardinal. The affair of the diamond necklace ruined him. (See LAMOTTE, JEANNE DE LUZ.) He was confined in the Bastille for his part in

that transaction until 1786, when he was set free, but dismissed from court utterly disgraced. In 1789 he was a deputy of the clergy of Haguenau to the states-general; but being accused of criminal correspondence with the refugees, and of other disloyal conduct, he resigned his seat, and retired to his estate on the Rhine. In 1801, in consequence of the concordat, he resigned the bishopric of Strasbourg.

ROHAN MONTBAZON, MARIE DE. See CHEVREUSE.

ROHILOUND, a region in British India, in the Bengal presidency, bounded N. by the hill territories which border the Himalaya, E. by Oude, and S. and W. by the Ganges; area, 12,428 sq. m.; pop. 5,217,507, about  $\frac{2}{3}$  of whom are Hindoos. Rohilcund comprises the districts of Shajehanpore, Budayoon, Bareilly, Pilibheet, Moradabad, and Bijnoor. The country is drained by several tributaries of the Ganges. Many of the fruits of temperate climates flourish, together with those of the tropics. Sugar, cotton, cotton cloth, and timber are the principal articles of exportation.—This territory derives its name from the Rohillas, an Afghan tribe who established themselves in it early in the last century. At the time of their invasion the country was subject to the nabob of Oude, who tried in vain to reduce it again to his authority. Warren Hastings furnished a British force to the ruler of Oude, by the assistance of which Rohilcund was plundered, and the people almost exterminated. The country was ceded to the British in 1801.

RÖHR, JOHANN FRIEDRICH, a German theologian, born in Rossbach near Naumburg, July 30, 1777, died in Weimar, June 15, 1848. He was educated in Leipsic, in 1804 became pastor at Ostra, near Zeitz, in 1820 went to Weimar as chief chaplain in ordinary and general superintendent, and in 1839 was made vice-president of the high consistory. He was one of the leaders of the rationalist party in theology, and wrote a number of theological works, of which the most worthy of mention are his "Letters in regard to Rationalism" (Zeitz, 1813), and "Principles and Doctrine of the Evangelical Protestant Church." He also wrote a "Historical and Geographical Description of Palestine in the Time of Jesus" (Zeitz, 1816; translated by Esdaile, Edinburgh, 1843).

ROKITANSKY, KARL, a German physician, born in Königgrätz, Bohemia, Feb. 19, 1804. He studied medicine at Prague and at Vienna, and in 1828 became attached as second and afterward as first assistant to the pathological and anatomical establishment of the last named city. In 1834 he became extraordinary and in 1844 ordinary professor of pathological anatomy, in 1848 honorary rector of the university of Prague and member of the Vienna academy of sciences, in 1849 dean of the medical faculty, and in 1850 rector of the university of Vienna. He was the projector of the great hospital of Vienna, and it is said that the dissections made either by himself or

under his immediate supervision amount to more than 80,000. He is considered in Germany as the highest authority in anatomy and pathology, and has written many valuable works. His principal production is the "Manual of Pathological Anatomy" (5 vols., Vienna, 1842-'6), which the Sydenham society of England caused to be translated into English (4 vols., London, 1845-'52).

ROLAND, called by the Italians ORLANDO, a paladin of the court of Charlemagne, and one of the most famous heroes of the chivalric romances of the middle ages, was, according to tradition, a nephew of Charlemagne, and was slain with the flower of the Frankish chivalry at the disastrous fight of Roncesvalles. The narrative of his defeat and death has been expanded by the romancers into a history full of picturesque and marvellous details; and in the "Romance of Roncesvalles," the rhymed chronicle *La Spagna*, the "Grand Chronicles," in Turpin's fabulous chronicle *De Vita Caroli Magni et Rolandi*, and later in the *Orlando innamorato* of Boiardo, the *Orlando furioso* of Ariosto, and the *Morgante Maggiore* of Pulci, he figures as the great exemplar of mediæval chivalry. The "Song of Roland," a metrical narrative of the hero's chief exploits, was for centuries a favorite with minstrels of the middle ages; and according to tradition, Taillefer rode before the Norman host at Hastings, animating the soldiers by its strains. His historical existence rests upon a doubtful passage in Eginhard's *Vita Caroli Magni*, and he is believed to be almost wholly the creation of fiction.

ROLAND DE LA PLATIERE, JEAN MARIE, and MANON JEANNE PHILIPON, French revolutionists, whose histories are so interwoven that they can be best treated in a single article. M. Roland (born in Villefranche, near Lyons, in 1732, died by his own hand near Rouen, Nov. 15, 1793) was destined for the church, at which he revolted, and at the age of 19, without resources, traversed alone and on foot the greater part of France. At Rouen he obtained employment with a relative, and finally received the appointment of inspector-general of commerce and manufactures at Amiens. He devoted his leisure to scientific studies, and was the author of 4 works on manufactures and rural economy in the series of "Arts and Trades" published by the academy of sciences (1779-'83). Meantime, on a visit to Paris in 1776, he had formed the acquaintance of Mlle. Manon Jeanne Philipon (born in Paris, March 17, 1754, died by the guillotine, Nov. 8, 1793). From early childhood she was a diligent reader of such books as fell in her way, among them the "Confessions" of St. Augustine and Plutarch's "Lives." At 11 years of age she obtained permission to spend a year in a convent preparatory to her first communion, and there formed an intimacy with a Mlle. Sophie Canet, with whom after their separation she kept up a correspondence for 8 years, published in 1841 (2 vols. 8vo.). It was one of Mlle. Canet's letters,

which Roland was commissioned to deliver, that introduced him to Mlle. Philipon; and, notwithstanding the great discrepancy of their ages, they were strongly attracted to each other. In 1776-'8 Roland travelled in Switzerland and Italy, and addressed to his brother, a prior in Paris, for her perusal, letters containing detailed accounts of their manufactures and commerce, which were afterward published (6 vols. 12mo., 1782). Finally he offered her his hand, which after some hesitation she accepted, and they were married in 1780. In 1784 they visited England, and studied together the workings of its political system. After their return he was transferred in his official capacity to Lyons, and there finished his principal work, the *Dictionnaire des manufactures et des arts qui en dépendent*, forming part of the *Encyclopédie méthodique* (4 vols. 4to. and 1 vol. of plates, Paris, 1785). She shared in all his labors, and says in her *Mémoires*: "Our misfortune was that he habituated himself not to think, not to write, but by me." Meanwhile Rousseau, her husband's favorite, had taken the place with her of St. Augustine; and they both hailed the revolution with enthusiasm. Roland became a municipal officer of Lyons, and his wife the principal editor of a new democratic journal. In Feb. 1791, they went to Paris, the former as commissioner to the national assembly on behalf of the workmen of Lyons. Mme. Roland's saloon in Paris became the rallying point of the Girondist leaders, whose actions she in a great measure controlled. In August they returned to Lyons, but in December, Roland's office with all similar ones having been abolished, they fixed themselves permanently at Paris. In March, 1792, he was called into the ministry of Dumouriez as minister of the interior, the Girondist party being then in the ascendant. His official duties were skillfully performed, his most important state papers being drawn up by his wife; but he offended the court by making his first appearance before it in plain citizen's costume, and sustained from the secret funds of his department Louvet's journal, *La sentinelle*, which urged the overthrow of royalty. Louis XVI. having refused his signature to the decrees for the banishment of the priests and for the formation of a camp of 20,000 men, Roland addressed to him a letter written by his wife, warning him in somewhat harsh terms that his tenure of the throne depended upon his compliance with the popular will and hearty support of the constitution. No answer being returned to this, Roland read the letter in full council to the king, who listened patiently, but two days later, with the advice of Dumouriez, dismissed him and his two Girondist colleagues. Roland at once repaired to the assembly and there read the letter, which was ordered to be printed and distributed to all the 83 departments. The storm thus raised broke forth in the insurrection of June 20, and paved the way for that of Aug. 10, when, the royal authority being suspended,

the Girondists were restored to the ministry. Danton was made minister of justice, and, offended at Roland's comparative moderation, incited the Jacobins and the populace against him by groundless charges and insinuations. The most scandalous reports were spread about Mme. Roland, but she defied them. The massacres of September struck the Rolands with horror, and M. Roland urged upon the convention the boldest measures for their suppression. During the trial of the king in December, Roland found important documents bearing against him in an iron chest in a secret closet of the palace, and submitted them to the convention; but occasion was taken from his having examined them without witnesses for renewed calumnies on the charge that he had subtracted some of them. On Dec. 7 Mme. Roland appeared before the convention to answer the accusations of her enemies, and cleared herself triumphantly. Their struggles proving useless, the Girondist ministers resigned, Jan. 22, 1793, and on May 31 Roland was arrested and held a prisoner in his own house. Mme. Roland rose from a sick bed to demand his release at the bar of the convention; but after waiting all day she failed to get a hearing, and on her return found that he had escaped. She was herself arrested on June 2, and during her imprisonment wrote her memoirs under the title of *Appel à la postérité*, the manuscript of which was preserved by her friend Bosc, who also adopted her daughter and only child, then 12 years old. Throughout her incarceration and trial her conduct was heroic, and on the way to the scaffold she occupied herself in comforting a despondent old man seated beside her in the cart. Of her *Œuvres complètes* (3 vols. 8vo., 1800) the first 2 volumes contain her *Mémoires*. Beside her correspondence with Mlle. Canet, there have been published *Lettres autographes de Mme. Roland, adressées à Bancal des Issarts* (8vo., 1835). Eight days after her execution the body of M. Roland was found 4 leagues from Rouen (in which city he had lain concealed for 5 months), pierced with the blade of a sword cane which lay beside him, and with a paper in his pocket protesting his honesty of purpose in all his actions, and concluding: "When I heard that my wife had been massacred, I would not remain any longer in a world stained with crimes." The corpse was carried to Paris and subjected to gross indignities.

ROLFE, ROBERT MONSEY. See CRANWORTH.

ROLLER, the common name of the *coraciada*, an old world sub-family of diurnal fissirostral birds of the passerine order, of which the typical genus is *coracias* (Linn.). In this the bill is long, straight, broad and elevated at the base, compressed on the sides, and hooked at the tip; the wings moderate and pointed, 2d and 3d quills longest; tail long and rounded, with the lateral feathers sometimes lengthened; tarsi much shorter than the middle toe; toes moderate, free at base, outer nearly as long as middle, and the hind one long;

claws moderate, curved, and acute. About a dozen species are found in Africa, India, and Australasia, one from Africa migrating into northern Europe; the food consists of insects and fruits principally. They are found solitary or in pairs in wooded districts, perching on the highest branches of dead trees, from which they take occasional flights in pursuit of insects on the wing; the nest is generally made in the holes of decayed trees, and the eggs are 4 to 7. The European roller (*C. garrula*, Linn.) is about the size of the jay of that continent; the back is light brown; the head, neck, and lower parts bluish green; lesser wing coverts bright blue; quills light greenish blue at the base, bluish black at apex; tail even, greenish blue, some of the outer feathers tipped with black; bill black. It is a native of Africa, whence it extends into Europe; it is a noisy bird, with a harsh voice, shy, restless, and preferring secluded forests; during its flight it has the habit of rolling or tumbling over in the air, like the tumbler pigeon, whence probably the common name is derived; it feeds on insects and fruits, which it obtains in the air or on trees, seeking also grasshoppers, worms, snails, myriapods, and small frogs and other reptiles on the ground; it is fond of breeding in holes of the birch tree, and in excavations in river banks, laying from 4 to 6 shining white eggs. It is common in Sicily, Malta, and Algiers, where it is often seen in the markets. Other species are the *C. caudata* (Linn.), of Africa, in which the outer tail feathers are elongated into slender filaments, and the *C. Indica* (Linn.), of Asia, of somewhat brighter colors; others are of about the same size, and of brilliant plumage, green and blue predominating. According to Gray, the todies and motmots of tropical America, and the boat-bills of India, belong to the family of *coraciadae* or rollers.

ROLLIN, CHARLES, a French scholar and historian, born in Paris, Jan. 30, 1661, died there, Sept. 14, 1741. The son of a cutler, he was intended for his father's trade; but through the friendship of a Benedictine monk he was gratuitously admitted to a school, the pupils of which attended classes at the college of Plessis. His course here being completed, he for 3 years studied theology, but did not take orders. When 22 years of age he was appointed professor in his college, and was in 1687 promoted to the professorship of rhetoric, and in the following year to that of eloquence in the college of France. In 1694 he was chosen rector of the university of Paris, which post he left in 1696 to assume the directorship of the college of Beauvais. His great talents for education were here fully displayed; he surrounded himself with a galaxy of distinguished teachers, whom he inspired with his own zeal. The excellence of his methods, and above all the moral and religious feeling that pervaded the course of instruction, were highly valued by the most enlightened minds of his time. But the success of Rollin excited the jealousy of the



Jesuits, who then held the college of Louis le Grand; charges of being a Jansenist were brought against him on account of his sympathies for the Port Royalists, whom he had supported with his purse and pen after the destruction of their house; and in 1712 he was dismissed from his directorship, but was allowed to continue his lectures at the college of France. His leisure hours were then devoted to preparing works for the special benefit of youth. In 1715 he published an edition of Quintilian's *Institutio Oratoria*, with valuable summaries and annotations. His *Traité des études* appeared in two parts, the first in 1726, the second in 1728. He now devoted himself to writing ancient history; the first 2 volumes were printed in 1730, and 8 more followed in succession till 1738. Although a mere compilation, and sometimes but a translation of ancient writers, Rollin's *Histoire ancienne* was eagerly read, and has since remained popular. In 1738 he commenced a *Histoire Romaine*, 5 volumes of which were published by him, while 4 others were left nearly completed at his death. It was continued up to the battle of Actium by his pupil Crévier, who afterward wrote a history of the Roman emperors. As early as 1701 Rollin had been admitted to the academy of inscriptions, but his opinions precluded his election to the French academy. Under the ministry of Cardinal Fleury he was subjected to indignities; his house and papers were searched; and although his perfect innocence and honesty were evident, he was officially warned to restrict himself to his literary pursuits, and a little later excluded from the meetings of the university. On his death every public homage to his memory was prohibited by the government. His *Œuvres complètes*, with annotations, have been published by Letronne (30 vols. 8vo., Paris, 1821-'5; atlas, 4to., 1827). An edition under the supervision of M. Guizot appeared about the same time. His *Traité des études* and *Histoire ancienne* have been frequently reprinted separately, in English as well as French. They are comprised in Didot's collection, *Chefs d'œuvre de la littérature Française*, respectively in 3 vols. and 10 vols. 12mo.

ROLLIN, LEDRU. See LEDRU-ROLLIN.

ROLLO. See NORTHMEN.

ROMAGNOSI, GIAN DOMENICO, an Italian jurist, born at Salso, near Piacenza, Dec. 13, 1761, died in Milan, June 8, 1835. Having practised law for several years, he published in 1791 *Genesis del diritto penale*, a disquisition on penal law, after which he was made chief civil magistrate of Trent and afterward aulic councillor. He was opposed to the French revolution, but in 1802 was appointed law professor in the university of Parma, in 1807 transferred to that of Pisa, and finally in 1808 held the same post in Milan. Meanwhile he published his most important professional work, his *Introduzione allo studio del diritto pubblico universale* (2 vols. 8vo., Parma, 1805; 5th ed., 2 vols. 16mo., Milan, 1836), and was engaged

with other eminent jurists in preparing a new code for the kingdom of Italy. The result of their combined labors appeared in the *Codice di procedura penale del regno d'Italia* (8vo., Brescia, 1807). From 1812 to 1814 he edited a *Giornale di giurisprudenza universale*, and published during the same period his *Discorso sul soggetto ed importanza dello studio dell'alta legislazione* (Milan, 1812), and also his *Principii fondamentali di diritto amministrativo*. On the fall of Napoleon he was deprived of all his offices, but, until Sept. 1817, was allowed to go on with his lectures, a condensed synopsis of which he published under the title of *Assunto primo della scienza di diritto naturale* (Milan, 1820). In 1818 he was tried for treason at Venice, and acquitted. His latter years he spent in Milan. Among his numerous publications during this period are his treatises *Della condotta delle acque* (6 vols. 16mo., Milan, 1822-'4), and *Sulla crescente popolazione* (1830).

ROMAIC. See GREECE, LANGUAGE AND LITERATURE OF, vol. viii. p. 462.

ROMAINE, WILLIAM, an English clergyman and author, born in Hartlepool, Durham, Sept. 25, 1714, died in London, July 26, 1795. He was the son of a French Huguenot, was educated at Christchurch college, Oxford, and in 1738 was ordained a priest in the established church. He devoted several years to the preparation of a new edition of Calasio's "Hebrew Concordance and Lexicon" (4 vols. folio), and in 1748 removed to London and became widely known as a preacher. His Calvinistic views of the articles of the church encountered strong opposition in several quarters, and while fulfilling his duties as lecturer at St. Dunstan's-in-the-West he was refused by the rector the use of the church in the daytime or of lights, and used to preach by the light of a candle held in his own hand. In 1755 he was deprived of his office of morning preacher at St. George's, Hanover square, which he had held 5 years, on account of "the popularity and plainness of his ministry;" and in 1757 he became so obnoxious to the university of Oxford, before which he had occasionally preached, that the further use of their pulpit was denied him. About the same time he was urged to take charge of a parish in Philadelphia, but declined. In 1764 he was chosen rector of St. Ann's, Blackfriars, which position he held until his death. At one period of his life he occupied the chair of astronomy in Gresham college. His works, consisting principally of sermons, were published in 8 vols. in 1796, with a memoir by the Rev. William Bromley Cadogan.

ROMAN CATHOLIC CHURCH, the name popularly given to the body of Christians throughout the world in communion with the bishop of Rome. It is not assumed by the church herself. The holy Roman church is understood of the local church of Rome; but the term Roman is used, especially in French documents, as one of the characteristics of the church, which is styled Catholic, Apostolic,

and Roman, because the see of Rome is its centre. In the congress of Vienna Cardinal Consalvi objected to the joint use of the terms "Roman Catholic," but was willing that they should be separately applied to the church, which is Roman by reason of its necessary dependence on the see of Rome, and Catholic on account of its universal diffusion. It is not confined to those of the Latin rite, but it includes all of every rite who acknowledge the bishop of Rome as their head under Christ. Above 160,000,000 are estimated to belong to it. About 150 archbishops, 600 bishops, and 80 vicars apostolic compose the hierarchy.—The chief doctrines of the church regard the unity of the divine nature in three distinct divine persons, and the incarnation of the second divine person, through the mysterious operation of the Holy Spirit in the Virgin Mary, and his death on the cross for the expiation of the sins of mankind. The belief of the incarnation is the ground and motive of the high veneration which is entertained for the Virgin, who is styled Mother of God, because Christ her son is God incarnate. To her is ascribed all sanctity and perfection which can be bestowed on a mere creature, and she is held to have been free from all stain of sin by a special privilege granted her that she might be worthy of the dignity for which she was divinely chosen. The mystery of the redemption is prominent in the teaching and worship of the church. Christ suffered and died, as man, to atone for the sin of our first parents, and the sins of all mankind. His death fully expiated the guilt of sin, and presented an atonement in every respect perfect. Yet all men are not justified and saved, but those only to whom the redemption is applied by means divinely prescribed. Baptism is believed to be a remedy for original sin applicable even to infants. Adults having the use of reason must believe in Christ and repent of sin, in order to receive the benefit of the atonement. From those who have forfeited baptismal grace, fruits of penance are required as evidences of their sincere conversion to God, and as conditions to entitle them to the application of the merits of Christ. Nothing that man can do can take away the guilt of sin, or prove an adequate satisfaction for it; but God requires the humiliation of the sinner, and accepts his penitential works, which derive value from the ransom offered by Christ. They add nothing to it, but they become acceptable through it. Christ is the essential Mediator, through whose blood we must sue for pardon and salvation.—The worship of the church is given to God only—the one eternal Being in the three divine persons—and the incarnate Word, God consubstantial to the Father. Inferior religious honor, which may be called worship in a qualified sense, is given to the Virgin Mary, on account of the gifts and graces with which God has endowed her, and her exalted dignity as Mother of God incarnate. The angels, namely, incorporeal spirits reigning with God, are honored

as his creatures, in whom his perfections are reflected, and his messengers, through whom he has manifested his will. Saints, those who have proved faithful in the divine service to the end, and are already crowned with glory in the kingdom of God, are venerated likewise for their triumphant virtue; the martyrs especially, who died amid torments rather than deny Christ, and the virgins, who throughout life preserved the purity of their affections, are deemed worthy of high honor. But there is an essential difference between the honor given to the creatures of God, and that which belongs to God alone. He receives the submission of the understanding and the will, the homage of the affections. He is acknowledged to be the essential Being, the supreme Lord, the beginning and the end of all things. Sacrifice is given to him only. Prayer, in its strict acceptation, can be addressed to him only, the Giver of every good gift. Grace and salvation depend on his bounty and mercy. Litanies and prayers to the saints are only appeals to them to intercede with God for us through Jesus Christ. They are not supposed to be omniscient or omnipresent; but they know in God the pious desires as well as the penitential sighs of the faithful. Respect is paid to the crucifix, which recalls to our mind the sufferings of Christ for our redemption, but it does not terminate in the symbol or material object. The kissing of the image, the bending of the knee, the prostration of the body in the ceremonial of Good Friday, are all directed to Christ our Redeemer. So the images of the saints awake the remembrance of their virtues. The bowing of the head to a statue, or the burning of incense before a shrine, is referred to the saint, whose memory is honored for his love of God and his zeal for the divine glory. Relics, that is, objects used by the saints, or particles of their remains, are venerated for the relation they bear to them.—The fall of the first parents of the human race is the fundamental doctrine on which the belief of the mystery of redemption depends. They were created in innocence, and raised to a state beyond the powers of nature, being constituted just and holy by a communication of divine grace, and rendered capable of immortality. The prohibition to eat of a certain tree in the garden in which they were placed, was intended to exercise their obedience, that their dependence on the Creator might be manifested. If they had been faithful, they would have transmitted to their descendants the supernatural gifts with which they had been endowed; but their disobedience involved the forfeiture of them for their posterity, as well as for themselves. Original sin is that transgression which is common to the whole human family, each one being estranged from God and liable to his wrath, in consequence of the act of the heads of the race. The natural powers have been weakened by the fall. The freedom of the human will remains, but it is less vigorous than in our first parents. Our nature is not vitiated

and depraved, but it is prone to evil, and exposed to violent temptation. It is despoiled of supernatural gifts, and cast down from the exalted position to which it had been gratuitously raised. A Redeemer was given us, in the person of Christ, who, being God-man, atoned by his sufferings for the sin of our first parents, and merited for us all grace by which temptation may be overcome.—Actual sin is the wilful transgression of the divine law by individuals having the use of reason. It supposes advertence to the malice of the action and the consent of the will deliberately given, although the advertence and consent may not be full, since sins of ignorance occur. The omission to perform duties positively prescribed is also sinful. The design to do evil is criminal even as the act, and the wilful contemplation of forbidden acts may imply guilt on account of the danger of consenting to them. Mortal sin is any act, speech, desire, or thought grievously opposed to the natural or divine law. Sins which imply no direct or grievous opposition to the law of God are styled venial, because their pardon is easily obtained, since they do not separate the soul from God. Slight impatience, rash words, vain self-complacency, may be venial. Deliberate hatred, gross calumny, acts of violence, not to speak of drunkenness, lust, and murder, are mortal sins. The distinction of sins is not derived from the individual who commits them, although they may be aggravated by his personal obligations. Forgiveness of sins, even the most heinous, is promised to the penitent. Sorrow for having committed them is a necessary disposition in order to obtain it. Perfect sorrow, which is called contrition, springs from divine love, and leads us to detest sin as opposed to the goodness of God and to his essential perfection. Attrition is sorrow of a less perfect kind, arising from an experience of the evil consequences of sin, and a dread of the punishments which await it hereafter. If it wean the heart from sin, and inspire an effectual detestation of it, so as to be accompanied with a firm resolution of amendment, it is held to be useful and salutary, and such as may dispose for pardon in the sacrament of penance. No degree of anguish of mind can insure our reconciliation with God as long as we are not firmly determined to shun sin and the occasions of relapse. The forgiveness of sin properly belongs to God, who is offended. Christ, as God-man, forgave sin, and authorized the apostles to impart forgiveness or withhold it. In virtue of this commission the power of forgiveness is exercised by bishops and priests, as delegates of Christ. The power is judicial, since they may bind or loose, retain or forgive; on which account a confession of sin is required from every applicant for its exercise. When this is made with sincerity, humility, sorrow, a willingness to repair the wrong committed, and a determination to shun the occasions of sin, the priest absolves the penitent. This absolution is a

juridical sentence, deriving its force from the divine institution.—The sacraments are rites instituted by Christ our Lord as instruments and means of grace, to apply to our souls the merits of his sufferings and death. They are said to contain and confer grace, technically *ex opere operato*, because they are effectual means divinely chosen to impart it, where no obstacle is presented by the receiver. Certain dispositions, however, are required on the part of adults who desire to partake of them. Faith and compunction are necessary on the part of the applicant for baptism. Sorrow with a firm purpose of amendment is likewise required from the professed penitent. The strengthening grace of the Holy Spirit is granted, by the laying on of hands with prayer, to the baptized believer whose heart is free from wilful sin. Sin is forgiven to the dying man who with penitence and hope receives the mystic unction, and for whom the prayer of faith is offered up. The imposition of hands is available for the communication of sacerdotal power, even to the unworthy candidate, but grace is given to him who is called by God, and who with humility corresponds to the divine vocation. Marriage is a great mystery, the image of the union of Christ and the church, to be celebrated with purity of affection. The eucharist, the chief sacrament, is to be approached with hearts cleansed from sin, under penalty of becoming guilty of the body and blood of the Lord, and incurring condemnation.—The grace of God, his free gift, by which the mind is enlightened and the will is strengthened, is necessary to conceive a good thought, and still more to undertake or perform any work directed to salvation. This is proffered to all, but is actually dispensed according to a just yet incomprehensible disposition of Divine Providence, with wonderful variety. It does not interfere with the freedom of the human will, which it moves and aids, without imposing necessity. The grace which moves to prayer, if complied with, is usually followed by the grace of action, which enables us to perform our duty. What is beyond our actual strength becomes practically possible, if not easy, by means of the help thus afforded us. To God properly belongs the glory of any good which we perform, because our sufficiency, our power, is from him; but to us the reward is promised, inasmuch as we might resist his impulse by abusing our freedom. It is not easy to reconcile the exercise of free will with the divine foresight. We cannot understand how it is possible for us to act independently, and of our own determination, when God from eternity has foreseen our action. It is sufficient for us to know and feel our freedom, without sounding the depths of divine knowledge. The church, having declared the necessity of grace for all supernatural acts, and for the beginning or first thought directed to such an end, has wisely abstained from deciding the controversies of the schools regarding the modes of reconciling the freedom

of the human will with such necessity, and with the divine foreknowledge. It suffices then to admit that without the grace of Christ we can do nothing, and to hold that we can do all things in him who strengthens us. The grace of God is not given to the elect alone, since Christ did not die for them only. God wishes all men to be saved, and grants graces remotely, if not proximately, sufficient for this end. The divine commandments are not impossible. If great difficulty be experienced in their fulfilment, even occasionally by just men, grace can be obtained by prayer by which it may be removed, so that what may appear impossible to nature may be rendered easy by grace.—Everlasting beatitude, consisting in the contemplation and enjoyment of God, is the reward promised by him on condition of the fulfilment of his commandments, and bestowed gratuitously on baptized infants or others incapable of personal acts. The punishment of grievous sin is eternal. Impenitent sinners are for ever separated from God, and suffer torments. Those who die guilty of slight faults, or debtors to divine justice, are withheld for a time from the enjoyment of heaven. The glory of heaven is immediately attained by baptized infants dying before the use of reason, by adults dying immediately after baptism, by martyrs, and by all who die with perfect love of God, and free from sin or debt of punishment. The soul only is admitted to happiness. The body is subject to dissolution, but is to be raised at the end of time, in order to be reunited to the soul, and made partaker of her glory. The degrees of beatitude vary according to the greater or less love of God which distinguishes each of the elect, even as star differs from star in brightness. All the saints, however, will be perfectly happy, because free from all suffering or pain, from all passion or inordinate desire, and rejoicing in the fulfilment of the divine will. We are not called on to scrutinize the divine decrees with regard to election to glory. Its attainment supposes coöperation and fidelity to grace on the part of adults. It is imparted as a reward. God cannot predestine any to torments without reference to their demerits and offences, since punishment is to be inflicted only for transgression.—The teaching of Christ our Lord becomes known to us especially by the preaching of the ministry, tracing back their commission to his apostles. Solemn definitions of faith are the most authoritative forms of this preaching. They are declarations not merely of doctrines contained in the written word, but of revealed truths, whether written or unwritten. Christ himself left nothing in writing; several of his apostles wrote much, and two other sacred writers composed narratives of his life and teaching; but many things belong to the deposit of doctrine, which were not explicitly placed on record. The body of bishops feel themselves authorized to propose as revealed truth whatever has come down from the beginning in the church, and been generally ac-

knowledge to appertain to doctrine. In cases of difficulty, when doubts have been raised with regard to some tenet, they feel themselves competent to examine the evidence, and decide whether the doctrine has been revealed. After a definition, it is no longer allowed to question a truth sealed with their approval. Infallibility in judgment is claimed for the body of bishops with their head, the bishop of Rome. By it is meant the providential guidance of the Holy Spirit, by which they are directed and enlightened in doctrinal decisions, that they may not mistake error for truth, or propose as divinely revealed what wants the seal of divine authority. The tribunal of the pope is universally acknowledged as competent to pronounce judgment in controversies which regard faith, and its decrees, directed to the body of bishops, or to the church at large, proposing doctrines under penalty of excommunication, when acquiesced in by the bishops, are final and irreversible.—The divine Scriptures are acknowledged by the church as the word of inspiration, written under the impulse of the Spirit of God, and to be received with all faith and reverence. The books of the Old Testament contained in the Jewish canon are admitted, to which are added certain other books written before the coming of our Redeemer, and known to the Jews, especially those of Alexandria, but not fully recognized as of binding authority. These are accepted by the church on ancient testimony, usage, and tradition derived from the apostles. The books of the New Testament contained in the canon include some of which doubt was entertained in the early ages. The canon of the third council of Carthage, held in 397, and that of Innocent I. and Gelasius in the following century, are followed in the list of sacred books adopted by the council of Trent. The church claims the supreme authority of determining the meaning of the Scriptures, in conformity with the general teaching of the fathers, that is, the ancient Christian writers.—Faith, according to the Roman Catholic view, is the assent of the human mind to divine truth proposed and attested by the church of God. The fact of revelation is essential, since no persuasion, however strong, can give to opinion the character of a revealed truth. It must be propounded by the church, in order to be regarded as a point of Catholic belief. Revelations made to an individual challenge the assent of his mind to the truth manifested to him; but an authoritative declaration by a divinely appointed teacher, the church, the pillar and ground of the truth, is necessary to afford certainty of the fact of revelation to men generally. The assent of the mind must be given to all revealed truth, for the authority of God is alike vouchsafed for all, and the testimony of the church extends to all. Faith is necessary to salvation, so that without it it is impossible to please God. The wanton and proud rejection of a single point of revealed doctrine involves shipwreck in faith. Want of oppor-

tunity of instruction, insufficiency of evidence proposed, weakness of understanding, and unavoidable prepossessions, may extenuate or excuse the denial of some doctrine, not recognized as revealed. Hence invincible ignorance is admitted by divines in respect to many not actual professors of Catholic doctrine, although God only can determine with certainty the individuals for whom such plea may be available. The exclusive language of church formularies, which declare that without Catholic faith none can be saved, receives this mild interpretation. All baptized children are claimed by the church as her own, since baptism is the sacrament of regeneration, and they continue such until by their wilful profession of condemned error they forfeit their birthright.—The natural law, as manifested by reason and declared in the decalogue, is the foundation of moral theology. The development of it in the New Testament guides theologians in their examination of duties and rights. The writings of the fathers illustrate many points. The decisions of popes and councils of matters submitted to their judgment are necessarily followed. Moral theology is the scientific discussion of all matters appertaining to conduct, and is consequently most comprehensive, since it embraces whatever has reference to vice or virtue, to the general principles of right, to the obligations of every station in life, and to the infinite variety of circumstances in which individuals may be placed. Much is necessarily left open for dispute in a science which comprises every imaginable case that may wear a moral aspect, on which account complaints are made of the latitude of theological opinions, favorable to relaxation of morals; but it is of no small importance that the great principles of morality should be broadly stated and steadily maintained. Confessors study casuistry, as physicians study maladies and infirmities, to understand human disorders, and apply the remedies.—The principles of the Catholic church with regard to civil duties are highly conservative. She is indifferent to forms of government and social institutions, and is content to exercise a salutary influence on society, by inculcating those maxims of right and order which are found in the gospel. She feels bound to respect established authority, and to enforce by moral suasion obedience to those in high station. The early apologists of Christianity confidently appealed to the persecutors themselves as witnesses of the loyalty and submission of the faithful. In the middle ages the church was occasionally in conflict with the civil power, because she sought to restrain the passions of rulers, who called themselves her children, by the laws and maxims of Christ, and to regulate society by the divine law. In the present state of the world, divided into so many independent kingdoms and states, and into opposite sects, she makes no effort to recover the control which she once exercised with advantage to the nations; but she is still intent on proclaiming

the revealed doctrines, and she uses every fit occasion to insinuate the axiom that religion is the only secure basis and strong bond of society. The duties of her members are dependent on the providential position in which they find themselves. They are to support law and order, and to fulfil faithfully every obligation to society. No collision can take place, for the church sanctions the performance of all civil duties, which certainly cannot embrace any thing in opposition to the divine law. It is a narrow and false policy to make temporal enactments calculated to straiten and distress conscience, which, if left free, would yield a prompt and generous obedience to all laws directed to secure the best interests of the commonwealth. The relations of the church to the state easily become intricate and perplexed, where they are intimate; but in the actual order of things, which keeps them wide apart, they are not likely to be confounded. There is no ground for imputing divided allegiance to Catholics, since, without detriment to their spiritual duty of obedience to the chief bishop in religious matters, they everywhere uphold the civil authority in temporal matters. It is not necessary to make either power dependent on the other, since each has its own sphere of action; but moral considerations must weigh over material force in the tribunal of conscience. The Christian who resisted the pagan effort to lead him to idolatry did not put the church above the state, by maintaining that it was necessary to obey God rather than men.—By discipline Catholics understand all that appertains to the government of the church, the administration of the sacraments, and the observances and practices of religion. The essential worship consists in the sacrifice of the mass, which, although mystical and commemorative, is real and propitiatory, being a continuation of the sacrifice of the cross. Vespers, that is, evening prayer, are solemnly sung, the psalms of David being employed in the divine praise, with the song of the Virgin Mary, and pious hymns, and prayers. Other portions of the divine office are sung in the cathedral churches of Catholic countries at various hours each day, by clergymen called canons, devoted to this duty. Beside the Lord's day, or Sunday, which from the apostolic times has been set apart for divine worship, in place of the Jewish sabbath, festivals are celebrated to honor the divine mysteries, and present them to the devout contemplation of the faithful. Many are solemnized in honor of the Virgin Mary, the apostles, martyrs, confessors, virgins, and saints of every class, whose virtues are thus set before the faithful for their imitation. Fasting is also a part of church discipline. Forty days before Easter are devoted to this exercise, in commemoration of the fast of our Lord during that period. Ember days, namely, Wednesday, Friday, and Saturday, in each of the four seasons, are observed as fasts to obtain the divine blessing for the seasons, and worthy ministers for

the church, ordinations being held at those times. The eve of great solemnities is observed by fasting, in order to prepare by penance for their celebration. Abstinence is observed on each Friday of the year, and in many countries on Saturday. All these penitential observances are matters of church law, which admits of dispensation. The rites of the mass, and the ceremonies used in the administration of the sacraments, appertain to discipline, which admits of variety and change, although great deference is shown for ancient usage. This serves to connect ancient and modern times, and to prove our harmony in faith and worship. For this reason the Latin liturgy, used from early times in the Roman church, is still employed by the celebrant, although instructions are given in the vernacular language, and facilities are afforded to the faithful for praying in a manner suited to their capacity. The chief points of practice on which changes have taken place in the course of ages are the manner of administering baptism and the eucharist, as also penitential discipline. The solemn mode of baptism was originally by immersion. The candidates used to descend into fountains or streams, or rivers, and sink beneath the waters under the pressure of the hands of the sacred minister. In cases of necessity and danger, less solemn modes were used, which, from being frequent, at length after the lapse of ages became universal. In like manner the eucharist, having been instituted by our Lord under the forms of bread and wine, was generally administered under both kinds for many ages. Exceptional cases were always admitted, which at length proved so numerous as to supersede altogether the ancient usage. The church claims the right to regulate, at her just discretion, whatever regards the manner of administering the sacraments, while she holds their substance to be inviolable. Penance for sin was always enjoined, and was proportioned to the degree of the guilt. It became a regular system about the 8d century. In the East it received a great check in the time of Nectarius, the predecessor of St. Chrysostom, the office of public penitentiary having been abolished at Constantinople in consequence of a scandal. In the West it was observed with more or less rigor for several ages, but was effectually set aside by the indulgences granted in the 12th and 13th centuries to volunteers in the wars called the crusades. The penitential canons ceased to be applied even in the tribunal of penance, and milder remedies were offered to those who were found unwilling to submit to the severe injunctions of the ancients. Penitential discipline is now almost exclusively confined to the sacrament. Indulgence, that is, pardon, was the name originally given to the relaxation of penitential rigor in favor of fervent penitents, or at the instance of persons entitled to special consideration. When public penance was exacted for heinous offences, the canons allowed the bishops occasionally to

abridge the time assigned, and thus to grant indulgence. Confessors of the faith, who were still prisoners, and exposed to martyrdom, sometimes interceded in behalf of their weaker brethren, who, by criminal compliance, had forfeited church communion, and incurred the obligation of public penance. After the change of discipline, indulgences assumed a new form. They were no longer necessary to release from the obligation of the ecclesiastical law, which had gone into desuetude, but they were offered to the penitent to aid him in satisfying divine justice, by applying to him the superabundant satisfaction of Christ and his saints. They served as incentives to works of piety, such as almsgiving, fasting, and prayer. They were not directed to the forgiveness of sin, which needed the sacramental remedy, but to the remission of the temporal punishment, which was often exacted by divine justice from those whose sins had been pardoned.—The organization of the church consists in its government by bishops, each in charge of a special flock, or portion of the faithful, with subordination one to another, and the dependence of all on the bishop of Rome, as shepherd of the whole fold of Christ. The episcopal character is the same in all bishops, but governing authority, which is called jurisdiction, is possessed in various degrees—in its fulness by the pope, who is the fountain, the streams of which flow to all others. He alone has apostolic authority, which may be everywhere exercised, with due regard to the local prelate, and which is suited to every emergency. During the vacancy of the Roman see, this plenitude of jurisdiction is believed to reside in the cardinals governing *ad interim*. Each bishop governs his own diocese, not as papal vicar, but as ordinary, that is, proper ruler, although in some things his authority is enlarged as delegate apostolic. Several dioceses form a province, which is governed by an archbishop, who however is not allowed to interfere with his suffragans unless when appealed to, or when a council over which he presides deems a visitation necessary. Many ecclesiastical provinces sometimes are united as a nation by means of a primate, who ranks above other prelates. The title of patriarch was given in the early church to the bishop of Alexandria, the see of St. Mark the disciple of Peter, and to the bishop of Antioch, which Peter had governed for some years. Jerusalem also received this title, and even Constantinople. At present there is scarcely a vestige of patriarchal power in these ancient churches, although the title is given to some bishops *in partibus infidelium*, but rather with a view to keep up the remembrance of the authority than to exercise it. Even the patriarchal prerogative of the pope is swallowed up in the majesty of his primacy, so that he seldom appears as patriarch of the West, choosing rather to rest on his supreme authority. The 6 senior cardinals derive their titles from suburbicarian churches. Eight metropolitanical sees with 17

suffragan bishops, and 36 bishops having no metropolitan, are directly subject to the Roman see. There are 9 archbishops and 24 bishops in Austria, beside 3 archbishops with 22 suffragans in Hungary; 15 archbishops and 65 bishops in France; one archbishop and 5 bishops in Belgium; and 2 bishops in Holland, the hierarchy, which was extinct, having been revived in them. England also has seen her hierarchy renewed, one cardinal archbishop now presiding over 12 suffragans. Ireland never lost her hierarchy, which contains 4 archbishops and 23 bishops. Spain has above 60 dioceses under 8 metropolitans; Portugal 20 bishops. Prussia has 2 archbishops with 6 suffragans; Russia 5 metropolitans and 5 suffragans. Constantinople is calculated to contain 10,000 Catholics of the Latin rite under a vicar apostolic, and 16,000 Armenians under an archbishop, with 11,000 in An-cyra of Galatia dependent on his authority. In western Asia, 11,000 Catholics are subject to the archbishop of Smyrna, and 13,000 to other prelates of the Latin rite; 500,000 are under the jurisdiction of the patriarch of Babylon, with 7 archbishops and 2 bishops; 1,100 priests and 1,000 monks of the order of St. Anthony are likewise in the same district. The Greek Melchites in communion with Rome are 50,000 in number, under a patriarch, 6 archbishops, and 5 bishops. The pope is acknowledged by 30,000 Syrian Christians, under an archbishop and 4 bishops. In Cilicia, Syria, Mesopotamia, and Lesser Armenia, a Catholic patriarch and 3 archbishops are found. The Catholics of Chaldea have a patriarch, 4 archbishops, and 5 bishops, with a scattered population of 17,000. In Arabia a vicar apostolic represents the pope, and a priest with governing powers acts as prefect apostolic. Persia has one or two bishops; India at least 5, with a Catholic population approaching 1,000,000. Several societies of priests under the direction of vicars apostolic labor in Tonquin, Cochin China, and Siam. There are 500,000 Catholics in the empire of China, under 3 bishops and 10 vicars apostolic. Africa has the smallest number of bishops; one with the title of vicar apostolic is found in Abyssinia, and two in Egypt. Constantina in Algeria has a bishop. A vicar apostolic is at the Cape of Good Hope; another has charge of Guinea and the western coast; two bishops are in adjacent islands. The American continent has a Catholic population of many millions governed by about 20 archbishops and 80 bishops. The Canadas and British possessions have 16 bishops with 2 metropolitans. The United States has 36 dioceses, with 8 vicariates, beside 7 metropolitan sees. There is no dependence or connection between the members of the hierarchy in the various portions of the continent, under different civil rulers, but all are linked together in unity by means of Rome, the common centre. The general government of the church is carried on at Rome, where the pope is assisted by the body of cardinals, several of whom compose standing committees to examine and

prepare the matters for final action. Nearly 80 belong to the congregation of propaganda, which is charged with a general superintendence of missionary countries. The appointment of bishops is made on the recommendation of the local prelates, with the advice of the cardinals. In several monarchies the nomination is given to the king or emperor, with a power of rejecting or confirming reserved to the pontiff.—The religious orders in the church are like corporations in a civil government, having special exemptions and privileges, to enable them successfully to pursue the objects of their respective institutes. They derive them from the pope, who, in virtue of his apostolical authority, exempts the members from the jurisdiction of the bishops in what regards their domestic discipline, but leaves them dependent on them for faculties to be exercised in behalf of the faithful. As the officers of the United States in each state exercise and represent the authority of the general government in their respective departments, so the orders in each diocese represent the papal power. Their privileges, however, are moderated and regulated in such a manner as not to weaken the diocesan authority, or favor insubordination, but only to encourage religious discipline and promote piety. The superior greatly lightens the burden of episcopal solicitude by training and watching over the members of the community, who themselves are rewarded for the restrictions to which they voluntarily subject themselves, by the security which is given them to pursue unmolested the path which they have chosen. It is not known that clerical corporations existed in the first ages, although it can scarcely be doubted that priests associated in some form for their own sanctification and the success of their labors. That ascetics were found in the apostolic times may be gathered from the writings of St. Paul, as well as from the early fathers. The persecutions drove many into the desert, which soon was peopled with hermits and monks under religious leaders, with the titles of abbots and archimandrites. Most of them were occupied with manual labor, and attended chiefly to their personal sanctification by prayer and other spiritual exercises; but some of the most eminent bishops of the East had a monastic training. The monks of St. Benedict in the West rivalled those of St. Anthony and St. Basil, and made the wilderness bloom by their industry. They did not originally enjoy exemption from the local authority, but in process of time they obtained it, to reward their fervor, and enable them to pursue the objects of their respective institutes without interruption. St. Bernard, in the 12th century, added lustre to the monastic calling by the splendor of his genius, as well as by his eminent virtues, but did not claim exemption from episcopal authority. The followers of St. Francis of Assisi soon afterward gave a more popular form to the ascetic life, which they introduced into villages and cities, while the



children of St. Dominic furnished zealous preachers who carried the gospel to the remotest provinces of the North and of the East. The Carmelites appeared in Europe, claiming descent from the sons of the prophets who had gathered around Elias. Augustinians traced their origin to the great champion of grace. Canons regular, and others of varied nomenclature, added to the number of religious institutes which adorned the church in the middle ages. —The history of the church commences with the pastoral commission given after our Lord's resurrection to the apostle Peter, who, after several years spent at Jerusalem and Antioch, passed to Rome, thence returned to Jerusalem and Asia Minor, and again to Rome, where he sealed his apostolic labors with martyrdom, about the year 67, on the same day as the apostle Paul. This event attached his office to this see. Clement, bishop of Rome, wrote to the Corinthians, in the name of the church, at the close of this century, while St. John was still alive, remonstrating with them on a schism which had broken out among them. The labors of the several apostles are not known in full detail. The apostle Paul labored more than all others, and with marked success. St. James, who is called the brother of our Lord, presided as bishop at Jerusalem, and died a martyr. St. John passed the latter years of his life in Asia, and terminated his course at Ephesus. St. Mark, the evangelist, founded the church of Alexandria. At the close of the apostolic age the Christian religion was widely spread, chiefly throughout Asia Minor and some more distant provinces, Greece, the adjacent islands, Italy, and Egypt. Gaul is believed to have been partially evangelized in that age, and Spain is said to have been visited by the apostle Paul, who purposed making this journey, and, as the national tradition will have it, by St. James. In the early part of the 2d century the countries on the left bank of the Rhine, as far as Belgium, had received the gospel, as St. Irenæus testifies. This holy bishop succeeded St. Photinus, disciple of St. Polycarp, at Lyons in 178. Britain received missionaries under Eleutherius, bishop of Rome, about the same time. A council of 70 African bishops was held at Carthage toward the end of the century; and 90 bishops assembled in Numidia. The relations of the bishops generally to Rome, on account of its higher chieftaincy, are distinctly stated by Irenæus, who, however, earnestly remonstrated with Pope Victor on his determination to cut off various Asiatic churches from communion for their attachment to the usage of celebrating Easter on the same day as the Jews. The middle of the 3d century furnishes us with the proceedings of a synod of Spanish bishops, who deposed Martial of Leon and Basilides of Astorga for criminal weakness in the persecution during the reign of Decius. The acts of various councils of African bishops are known, especially from the writings of St. Cyprian, who

warmly resisted the decree of Pope Stephen by which the repetition of baptism conferred by sectaries was forbidden. The controversy finally resulted in the following century in the acquiescence of the church generally in the decree, which was supported by the council of Nice. The 4th century, after some scenes of persecution, witnessed the triumph of Christianity by the conversion of the emperor Constantine. Although he decidedly favored it, and lent his power to its support, nevertheless he is believed not to have received baptism until the approach of death, when Eusebius of Nicomedia, an Arian, is stated to have baptized him. By his mandate a council of bishops was called at Nice, where 318 convened in the year 325, and proclaimed Christ to be God, consubstantial to the Father. Sylvester, the bishop of Rome, was prevented by old age from being present, but Osius of Cordova and two priests represented him. The Nicene symbol met with great opposition on the part of bishops who had received the doctrines of Arius, and were supported by Constantius, the successor of Constantine. A council of bishops at Rimini, under imperial influence and constraint, consented to suppress the term which proved so offensive, and the occasion of so much strife; but on recovering their liberty they retracted, and Pope Liberius annulled their acts by the authority of Blessed Peter. The 5th century was illustrious for the pontificate of St. Leo, whose prayers were believed to have turned away the wrath of Attila, advancing to destroy the fair city, so long queen of the earth. His exposition of the mystery of the incarnation crowned the efforts of his predecessors for the maintenance of the faith, and received the homage of the bishops assembled at Chalcedon. "This," they cried, "is the faith of the fathers. We all have this faith. Peter has spoken by the mouth of Leo." At Nice the fathers developed the meaning of the apostolic symbol by phrases and clauses necessary to meet the subtleties of innovators. At Constantinople a special statement was inserted in the creed to place the divinity of the Holy Spirit beyond dispute. At Ephesus the bishops inflicted excommunication on Nestorius, bishop of Constantinople, for obstinacy in resisting the authority of Pope Celestine, who condemned his errors. At Chalcedon the letter of St. Leo was adopted as the symbol of orthodoxy, and subscription to it was exacted, under the same penalty. Those councils served to define with precision and make known with certainty the revealed mysteries, and were generally subsidiary to the papal action. The acts of those of Nice and Constantinople are not preserved in their integrity, but the extant records of those of Ephesus and Chalcedon show that the legates of the pontiff led the way, and the fathers followed his authority. At the close of the 6th century Gregory the Great, bishop of Rome, conceived the grand idea of evangelizing the Angles, or English,

who had settled in Britain without adopting the Christian faith of its former inhabitants. The mission of the monk Augustin, at the head of a band of his brethren, proved eminently successful. His miracles, as well as preaching, converted his hearers, a see was founded at Canterbury, and the church was fully organized with close dependence on the chair of Peter. The 7th century was marked by the general diffusion of the faith in England, and the more perfect organization of the English hierarchy. In the 8th century the Germans in great numbers were brought to the faith by the preaching of Boniface, called also Winifrid, an English missionary. He distinguished himself by his devoted attachment to the apostolic see, to which he made a solemn oath of duty. Various other missionaries, from Ireland especially, preached the faith about the same time with like success. It spread also toward the regions of the north, Denmark, Sweden, Norway, and remained fruitful of good works until the 16th century. The scandals of the 10th century disfigured the church, since unworthy men struggled to occupy the papal chair, or to place in it their relatives and adherents. The influence of the emperors of the West had greatly declined, and some Italian nobles aspired to the pontificate. The intrusion of one or two youths and of several men of licentious habits disgraced the high office; but after a time the cloud passed away, and men of wisdom and piety were once more at the helm, directing the bark of the church through the shoals and rocks, and amid the raging storms. Hildebrand, styled Gregory VII., attained to the pontificate in the year 1073. He was a man of stern virtue, determined at every hazard to root out scandal from the sanctuary. With all his zeal and the authority of his office, he condemned the marriage of the clergy, which from toleration had gained a coloring of right. He resisted the emperor Henry IV., who disposed of bishoprics, abbacies, and other high offices, for bribes and like corrupt considerations. The inveterate character of these abuses and the imperial influence involved the saintly pontiff in a long and fierce struggle, in which he seemed to succumb, dying in exile, but in reality overcame, leaving his successors to reap the fruits of his labors. The contest between the popes and emperors continued, with intervals of rest, throughout the 12th and 13th centuries. Investitures were the chief subject of disputes, the popes resisting the claims of the emperors to invest bishops with the temporalities of their sees, by delivering to them the ring and crosier, chief symbols of episcopal authority. The opportunity thus furnished for promoting unworthy men, courtiers, and favorites, determined the popes to vigorous resistance; and although Paschal II. yielded for a moment to imperial violence, on the recovery of his liberty he retracted his consent, and humbled himself for his weakness. Innocent IV., in the middle of the 13th century, in the

council of Lyons deposed the emperor Frederic II. for various acts of simony, sacrilege, and tyranny, following out the principles and the example of Gregory VII., who was the first to proceed to a similar deposition. The 14th century is remarkable for the removal of the papal chair to Avignon by Clement V., whose example was followed by his successors for 70 years, popularly styled by the Romans the captivity of Babylon. These French popes were bishops of Rome, which they governed by cardinal vicars acting in their name. The restoration of the chair to the eternal city was followed by a schism, formed by French cardinals, who elected Clement VII. in opposition to Urban VI., the pope residing at Rome. An attempt to terminate the rupture by setting aside both claimants, resulted in the election of Alexander V. in the council of Pisa, who not being generally recognized, the three pretendants had their respective followers. At length, in the council of Constance, held in 1417, Martin V. was chosen and acknowledged. The Greeks returned for a short time to the communion of the Roman see in the council of Florence held in 1439, but were drawn back into the gulf of schism by the persevering efforts of Mark, bishop of Ephesus, who resisted every influence employed by his colleagues and by the emperor at the council. Constantinople a few years afterward fell under the power of the Turks, and the degradation of the eastern church and empire was alike consummated. Some popes of doubtful fame appeared in the decline of the 15th century, and one of acknowledged depravity at its close. The warlike career of Julius II. and the golden age of Leo X. were not calculated to restore the high character for austerity and zeal which the pontiffs had generally borne. The bold monk of Wittenberg appeared on occasion of the indulgences which Leo offered to contributors to the grand fabric of St. Peter's. The rivalry of two religious orders resulted in theological disputes, which on the part of Luther were marked by great boldness. His German prepossessions against Rome gave animation and popularity to his effusions. He soon became a leader, and before he was fully aware, he was head of a sect inculcating principles subversive of the papal authority. A swarm of minor sects soon appeared, and a vast portion of the Catholic world—perhaps fully a third—was drawn away from obedience to the pontiff. Henry VIII., king of England, ventured on the theological arena to drive back the daring monk beyond the ring, and received plaudits from Leo as defender of the faith; but he also from a champion became an enemy when his desires for the society of Anne Boleyn were thwarted by the Fabian policy of Clement VII. The progress of the reformation was soon arrested by the zeal of many devoted men, founders of various religious institutes, especially by the followers of Ignatius Loyola, whose labors caused a considerable reaction in favor

of the church of Rome. The saintly Pius V. and the stern Sixtus V. performed well the duties of their office, which were also fulfilled with edification by others of less marked character. The subtleties of Jansenius, bishop of Ypres, annoyed the church in the 17th and 18th centuries, his followers, after his example, employing the authority of Augustine to countenance doctrines decidedly Calvinistic. The French church especially was harassed by these innovators. The contentions which prevailed throughout the early part of the 18th century prepared the way for the triumph of infidelity in the revolution. In the present century there is a manifest return to Catholic unity. The church of France, after the endurance of a persecution of the most frightful character, stands in intimate union with the see of Peter. The same sentiments prevail throughout the Catholic portions of Germany, as also in the Spanish dominions, and generally everywhere, although Portugal and some other places are subject to the influence of liberals. Notwithstanding the spoliation of the present pope, whose temporal dominions have been wrested from him, there is unquestionably a sound Catholic sentiment generally. The discipline of the church is also in vigor, as far as could be expected in an age so frequently disturbed by civil war and revolutions.

ROMAN LAW. See CIVIL LAW.

ROMAN LITERATURE. See LATIN LANGUAGE AND LITERATURE.

ROMANA, PEDRO CARO Y SUREDA, marquis de la, a Spanish soldier, born in Palma, island of Majorca, in 1761, died in Cartaxo, Portugal, July 23, 1811. He entered the naval service, and in 1782 participated in the siege of Gibraltar by the united forces of France and Spain. When the war broke out between these two powers, he joined the army, and distinguished himself from 1792 to 1795. In 1800 he was appointed captain-general of Catalonia, and then a member of the supreme council of war. When Napoleon, in order to bind the Spanish government to his policy, forced them to place an army at his disposal, these troops, 15,000 in number, were intrusted to the command of La Romana, and sent in 1807 to Pomerania; but the general, hearing of the conduct of Napoleon toward both Charles IV. and Ferdinand, determined to leave at once the service of the conqueror. He communicated with the commander of the English fleet cruising at the entrance of the Baltic, and, availing himself of his troops being then in the island of Fünen, succeeded in embarking them on board some English men-of-war, Aug. 17-20, 1808, and landed them safely at Corunna. He was subsequently prominent in organizing the bands of guerillas which proved so terrible to the French. He left a diary, published with some of his letters in the supplementary collection of the French *Mémoires relatifs à la révolution Française* (8vo., Paris, 1825).

ROMANCE. See NOVEL.

ROMANCE LANGUAGE, a language supposed to have been formed from the corruption of the Latin, and to have prevailed in the south of Europe from the 10th to the 14th century. Of this tongue F. J. M. Raynouard composed a grammar (Paris, 1810) and a lexicon (Paris, 1838); but it is now generally admitted that there was no such uniform general language, though there was naturally a great similarity in the various languages formed from the Latin and succeeding it, especially in Italy, the Iberian peninsula, and France, each of whose languages is treated in this work under its own title. The branch most conspicuous in European literature during the period from the 10th to the 14th century is the *langue d'oc* or Provençal; of this some account is given in the articles FRANCE, LANGUAGE OF, and PROVENÇAL POETRY. For an account of the Rouman language, also an important offshoot of the Latin, see WALLACHIA. The Romansh, which is also of Latin origin, is spoken in the valley of the Inn, but has no literature of importance.

ROMANIA. See ROUMELIA.

ROMANO, GIULIO. See GIULIO ROMANO.

ROMANOFF. See RUSSIA.

ROMANS, EPISTLE TO THE, addressed by the apostle Paul to the church of Rome, one of the canonical books of the New Testament. The epistle was written during the second abode of the apostle at Corinth, where he stayed about 8 months after having made a journey through Macedonia and Achaia. Paul despatched the letter by a Cenchrean woman who was travelling to Rome, and sent greetings from an inhabitant of Corinth. As to the time of its composition, most of the commentators are of opinion that it was written in A. D. 58 or 59. It is still a controverted point whether the epistle was called forth by special circumstances, or whether the apostle, in the selection of his subject, had no reference to any external occasion. Most of the modern commentators are in favor of the former opinion, and many of them suppose that the debates mentioned in ch. xiv. and xv. called forth the epistle. The special bearings of the epistle are particularly manifest in ch. xiii. to xvi., in which Paul shows to both Jews and gentiles the glory of Christianity as being the only true religion, and especially endeavors to confirm the faith of the converts from Judaism.—As to its contents, the epistle consists of two chief divisions, one of which is argumentative, the other hortatory. In the former, the apostle after an introduction (i. 1-16), in which he expresses his desire to see the Romans, sets forth the gospel plan of salvation. The gospel is a power unto salvation to every one who believes, both Jew and gentile; it is needed by all, for none, not even the Jew by his law, are justified before God (i. 16 to iii. 20). It is only faith in Christ which works justification, even as Abraham and David were justified by faith (iii. 21 to iv. 25). Those who are justified have peace with God, and rejoice; for through Christ, the Reconciler, a

new life has begun for mankind (ch. v.). But with reconciliation holiness must be connected, not under law, but under grace (vi., vii.). The spirit of life in Christ overcomes sin and the flesh, and all earthly sufferings, through hope; the believer lives already here below in security (viii.). The apostle then deplores the rejection of Jews, but finds some consolation in the assurance that it will not be final (ix. to xi.). In the second or hortatory part the apostle enjoins various duties (xii.), in particular duties to magistrates (xiii.). He urges mutual forbearance (xiv.), and especially admonishes the strong to bear with the weak (xv.), and concludes with various salutations and directions (xvi.).—The authenticity of the epistle has hardly ever been impugned; among modern theologians, Bruno Bauer is the only one who has denied it. But some theologians of note, as Semler, David Schultz, Weisse, and Ewald, have maintained that chapter xvi. did not form originally a part of the epistle. Weisse and Ewald consider it a fragment of an epistle addressed to the Ephesians.—The literature on this epistle is very copious, and is detailed in De Wette's *Einleitung in das Neue Testament* (6th ed., Berlin, 1860), pp. 295–6. Among the recent German commentaries, those by Tholuck (5th ed., 1856), Umbreit (Gotha, 1856), and Ewald (Göttingen, 1857) are especially valued. The most important work on the epistle which has been produced in the English language is Stuart's "Commentary on the Epistle to the Romans" (Andover, 1832). In England a translation and critical notes have been published by Prof. Jowett (London, 1856).

ROME, a township and semi-capital of Oneida co., N. Y., on the Mohawk river; pop. of the township about 10,000; of the village in 1860, 6,246. It is the S. terminus of the Ogdensburg, Watertown, Cape Vincent, and Rome railroad, and of the Black river canal, which here unites with the Erie canal; and it is also an important station on the New York central railroad. It contains a U. S. arsenal, a court house, 2 newspaper offices, an academy, and several manufactories. The township contains 17 churches, viz.: 2 Baptist, 1 Episcopal, 1 Lutheran (Evangelical), 5 Calvinistic Methodist, 2 Methodist Episcopal, 1 German Methodist, 2 Presbyterian, 2 Roman Catholic, and 1 Universalist. Fort Stanwix, built in 1758, was situated in the township. Its name was changed by Col. Dayton, who took it in 1776, to Fort Schuyler, but no vestiges now remain.

ROME (Lat. and It. *Roma*), the chief city of ancient Italy, and eventually of the world, the origin of which is lost in the mists of antiquity. Modern criticism has destroyed all belief in the legends that for many centuries had passed for the early history of Rome, but it has supplied nothing to replace it beyond ingenious theories. It was originally a Pelasgic town on the Palatine hill, and the city was formed by a union of Roma with the Sabines and Etruscans who were settled on the neighboring hills. This union

appears to have reached a state of political and constitutional perfection about 5½ centuries B. C., in the reign of that monarch who is known as Servius Tullius, and toward the close of the regal period. During that period there had grown up a Roman state (according to the legends ruled successively by Romulus, Numa, Tullus Hostilius, Ancus Martius, Tarquin the Elder, Servius Tullius, and Tarquin the Proud), which seems to have been a powerful monarchy, and which may have been, as Müller thinks it was, in the times of the Tarquins and Servius, ruled by an Etruscan dynasty, by whom Etruscan usages were introduced into Rome. This monarchy embraced a portion of Etruria, and the whole of Latium. What is known as the fall of the Tarquins was probably the overthrow of the Etruscan power. The population of Rome then consisted of the patricians and their clients, and of plebeians. The patricians were the original Roman people, and were divided into 3 tribes, viz.: the Ramnenses, the Titienses, and the Luceres, who represent the Latin, the Sabine, and the Tyrrhenian elements of that population. The clients were the dependants of the patricians. The plebeians, or commons, were freemen, but had originally no political rights. They owed their existence to several causes, the principal of which was the success of the early wars of the Romans; and they were mostly of Latin origin. By the Servian constitution, they were incorporated into the state, and became possessed of considerable political power. This change was long regarded as the subversion of a popular constitution, by the substitution therefor of an aristocratical polity; but Servius, or whoever it was by whom the change was made, did really, by the establishment of the constitution of the centuries, break up the patrician monopoly of power, and prepare the way for those further political reforms by the success of which Rome became mistress of the ancient world. The change was liberal in its character, and opposition to its facts and its principles was never permanently successful. That regal Rome was powerful, and possessed an extensive territory and a large population, is established by the greatness of its public works, some of which endure to this day; and by the terms of the treaty between Rome and Carthage, which treaty, made in the first year of the republic, shows that the whole Latin coast was subject to Rome. The republican polity is supposed to have been established about the year 510 B. C.; but there is no trustworthy Roman history for nearly 2½ centuries from that date, or about the time of the war with Pyrrhus. The Servian constitution, as a whole, was lost as one of the effects of the overthrow of the monarchy; but it was gradually, though only in part, restored, its principles however characterizing all the subsequent struggles of the plebeians to obtain power in the republic. Early republican Rome was a weak state, and for 1½ centuries it exercised little influence at

home, and none abroad. Not only the kings fell, but the country fell with them. Rome was conquered by Porsena, and when that Etruscan king was slain at Aricia, and she recovered her freedom, she was no longer the head of Latium; and during the next 150 years she was employed in recovering the ground she had lost. The reason that her advance was so slow is to be found in the internal convulsions to which she was subjected. The political contests between the patricians and the plebeians were of the bitterest character, and more than once they threatened the utter destruction of the state. The plebeians seceded from Rome in 494 B. C., with the intent to found a new city; but a compromise was effected, and plebeian tribunes were created, for the purpose of protecting members of their order against the cruel and unjust action of patrician magistrates; and during their year of office, the persons of these tribunes were to be sacred and inviolable. The number of tribunes was increased, until they became 10; and they possessed the veto power, which enabled them to stop any law, or to annul any decree of the senate, without assigning any cause for their action. They were the representatives and protectors of the plebeians, and none but plebeians could be made tribunes. The plebeians were at the same time allowed to elect two *ædiles*. By the *Publilian law* it was provided that these tribunes and *ædiles* should be chosen by the tribes in the forum, and not at the assembly of the centuries in the *Campus Martius*. The first free election was held in 470 B. C. *Spurius Cassius*, who was finally put to death by the patricians because he had successfully advocated a popular agrarian law, formed leagues with the Latins and Hernicans, by which the Volscians and *Æquians* were prevented from conquering Rome and Latium. The legends of the elder Brutus, *Lucretia*, *Valerius Publicola*, *Horatius Cocles*, *Mucius Scaevola*, *Menenius Agrippa*, *Coriolanus*, *Cincinnatus*, and the *Fabii* belong to this first period of the republic. Historically, *Cincinnatus* appears as a stern oligarch. The *decemvirate* was established in 451 B. C., and lasted but two years, the period of its existence being a patrician despotism, to which belongs the legend of *Virginia*. The consuls elected in 449 (according to some the first, the supreme magistrates of the republic having previously been called *prætors*) were *L. Valerius Potitus* and *M. Horatius Barbatus*. Several popular laws were passed under their lead, by which an appeal to the people was secured to every citizen, the people including the plebeians, and the assembly of the tribes was endowed with full legislative power. The *Canuleian law* provided that patricians and plebeians might legally intermarry. A proposition to throw the consulship open to the plebeians led to the establishment of military tribunes, to which offices plebeians were eligible. The *censors* were now first appointed. The ques-

torship was thrown open to the commons in 421, and this opened the senate to them. Veii was conquered in 396 by *Camillus*. Rome was taken by the Gauls, who left the city in ruins, in 390. The people then wished to settle at Veii, but their design was prevented through the influence of *Camillus*. They were reduced to great misery, and to this time belongs the story of *Manlius Capitolinus*, who, like earlier popular leaders, was charged with aspiring to kingly power by the patricians, and put to death. The *Licinian rogations* were brought forward in 376, by the tribunes *C. Licinius Stolo* and *L. Sextius*; they provided that debtors should be relieved, that the occupation and use of the public domain should be limited, and that one of the consuls should be a plebeian. After a contest of 9 years, these rogations prevailed, and became law; and during the contest a law was passed committing the charge of the *sibylline books* equally to plebeians with patricians, which was an invasion of the monopoly of the religious ministry of the state which the latter had long held. *L. Sextius* was the first plebeian consul, chosen at the election next following the triumph of the measures of himself and his colleague. At this time the judicial power was taken from the consuls, and placed in the hands of the *prætor urbanus*, a newly created patrician magistrate. The *curule ædileship* was created, to which members of both orders were eligible. These changes were the most important events of Roman history. Not only did they go far to unite the two orders, and so put an end to those civil contests which had prevented the military advance of the Romans, but they created that body of men from whom the legions were recruited, and by whom the conquest of Italy was effected. But for this, the *Samnites* would probably have become masters of the Italian peninsula. The patricians did not immediately submit to the *Licinian laws*, both consulships being at times held by members of their order down to 343 B. C.; but after that time they were divided regularly. In 173 both consulships were opened to the plebeians. The first plebeian dictator was *C. Marcius Rutillus*, 356 B. C., who was chosen censor 5 years afterward. For many years after the restoration of Rome under *Camillus*, the wars waged by the Romans were not of a striking character. They were carried on against *Volscians*, *Æquians*, *Etruscans*, and *Gauls*, and were successful contests, the victors behaving with much liberality to those of the vanquished whom they incorporated into the state, making them citizens, and increasing the number of the tribes. Fears of the Gauls led to the renewal of the Latin league in 358. The first *Samnite war* began in 343, and the immediate occasion of it was the demand of assistance by the *Capuans* against the *Samnites*, they surrendering their city to Rome. It lasted but a year, when peace was made, in consequence of the renewal

of internal troubles; and the settlement of those troubles was followed by the Latin war, which ended (339) in the complete triumph of the Romans. The second Samnite war was begun in 326, and lasted 22 years. Its fortunes were various, but the Romans were finally victorious. The Etruscans made war upon Rome, but were defeated. The third Samnite war opened in 298, and Samnium submitted to Rome in 290. The Gauls and Etruscans were also defeated in the same war. During the time of these wars several political measures were carried at Rome which tended to establish equality between the two orders; and by the Ogulnian law the pontificate and the augurate were opened to the plebeians. The passage of this law, 300 B. C., is considered as the establishment of the Roman constitution. "What is called the constitution of Rome," says Arnold, "as far as regards the relations of patricians and plebeians to each other, was in fact perfected by the Ogulnian law, and remained for centuries without undergoing any material change. By that law the commons were placed on a level with the patricians; and the contests between these two orders were brought to an end for ever. The comitia too had assumed that form, whatever it was, which they retained to the end of the commonwealth; the powers of the magistrate as affecting the liberty of the citizen underwent but little subsequent alteration." The civil troubles that subsequently occurred were of a social character, or were brought about by the ambition of able men who sought to make use of "the forum populace," a class of persons entirely distinct from the plebeians, with whom, however, they are often confounded; or they were caused by attempts to effect great reforms, like those of the Gracchi, which sought the restoration of the old constitution after its provisions had long been neglected or violated by the ruling classes. The last secession of the plebeians took place in 286 B. C., and was appeased by the enactment of the Hortensian laws, which reduced debt, divided lands among the needy, and provided that all the resolutions of the tribes should be law for the entire people. This last measure clothed the people with supreme legislative power, and took from the senate its veto on their action. The dictator Hortensius put an end to that dispute in which the people had been supported by Curius Dentatus, one of the most popular Roman characters, both with his contemporaries and in history. He had previously conquered the Sabines of the mountains. The extension of their dominion to the south now brought the Romans into collision with the Italian Greeks, at the same time that they were defeating the Gauls in northern Italy. They aided the Thuriens, who were of Greek origin, against the Lucanians and others, who were believed to be incited by the people of Tarentum, one of the most opulent and powerful of the Hellenic communities. A Roman army was marched

to Tarentum, and the Tarentines called Pyrrhus, king of Epirus, to their aid. This was at the close of the year 281 B. C. Pyrrhus landed in Italy with more than 20,000 men, and defeated the Romans at Heraclea, and afterward at Asculum. He was not well supported by the Italians; and in consequence of an alliance between Rome and Carthage, he made peace with the Romans, who had an excellent consul in Fabricius, and went to Sicily, where he pursued a brilliant but unsuccessful career until 276, when he returned to Italy, where he was defeated by Curius Dentatus, near Beneventum. The Romans now pursued their course of Italian conquest, and about 264 B. C. they became masters of all ancient Italy. In the same year the first Punic war broke out.—The Romans resolved to assist a body of mercenaries, called Mamertines, who had possession of Messana in Sicily, against Hiero, king of Syracuse. Hiero was defeated and retired, but the victors then attacked a Carthaginian force, which also had been sent to the assistance of the Mamertines, and defeated it. War was then declared against Carthage. It lasted 23 years, with various fortune. Though ignorant of naval matters, the Romans soon learned to defeat the Carthaginians at sea, after having rapidly effected the conquest of nearly all Sicily, making peace with Hiero, and leaving him in possession of his small but rich kingdom. Their first naval victory was that which was won by O. Duilius, in 260. It was followed by other successes, and Sardinia and Corsica were invaded. The Carthaginians were reduced to the defensive in Sicily, holding there only a few strong places. In 256 M. Regulus and his colleague Manlius defeated the Carthaginians in the greatest sea fight of those days, and then landed in Africa, which was incapable of making any resistance. Regulus was left to continue the work of conquest, with only 15,500 men; but he was defeated, and his army destroyed and himself taken captive, by an army commanded by the Greek Xanthippus. The Romans also lost two fleets by storms. They were more fortunate in Sicily, capturing Panormus, and totally routing the Carthaginian army that sought to recover the town. The Romans began the siege of Lilybæum in 249, building a third fleet to blockade it, but which was destroyed by the Carthaginians. Another fleet was lost at sea. Hamilcar now took command of the Carthaginians, and though but feebly supported he carried on the war with considerable success, the Romans still maintaining the siege of Lilybæum. A fourth Roman fleet was prepared, which destroyed that of Carthage. Peace was then made, on harsh terms to Carthage, and Sicily became the first Roman province. Taking advantage of the war that Carthage was compelled to wage with her mercenary soldiers, Rome demanded of her the cession of Sardinia and Corsica, and the sum of 1,200 talents, to which no resistance could be made. For some years there were

but few campaigns, and in 235 the temple of Janus was closed. Colonies had been founded during the war with Carthage, and the number of tribes was increased to 35. The Romans first crossed the Adriatic in 229, when they conquered the Illyrians, and sent envoys to Greek states to explain their proceedings, who were well received. They were threatened with a Gallic war, which was to them always the source of peculiar terror, and it was ascertained that the whole number of available men was 750,000. The war began in 225 and lasted 4 years, the Gauls being beaten, and the Roman arms carried far toward the Alps. At this time were to be seen the beginnings of that popular party which in future years was to have so important a place in the republic, but the growth and action of which were stayed for a century by the operation of external events. A new war with Carthage was impending. The conquests of Hamilcar and Hasdrubal in Spain alarmed the Romans; and in 228 they concluded a treaty with Hasdrubal, by which it was arranged that the Carthaginians should not go beyond the Ebro. Hasdrubal was killed 7 years later, and was succeeded by his brother-in-law Hannibal, who completed the Carthaginian empire in Spain to the south of the Ebro and the Douro. He besieged and took Saguntum, a Greek city in alliance with Rome. The Carthaginian government having refused to deliver up Hannibal for this action, Rome declared war in 219. The next year Hannibal marched to Italy, through Spain and Gaul, and reached that country in about 7 months, with 26,000 men, having lost or dismissed nearly three fourths of his army, but many Gauls soon joined him. He defeated the consul Scipio in the engagement of the Ticinus; and then his colleague Sempronius at the battle of the Trebia, in which both consular armies took part. In the spring of 217 Hannibal marched south, and defeated and destroyed the army of the consul Flaminius, at the battle of Lake Trasymenus, the consul himself being slain. He made captives of the Romans who were taken, but dismissed the Italian allies, his war being directed against Rome only. The Romans made Q. Fabius Maximus dictator, and that officer maintained a strict defensive, refusing to give battle. Hannibal, who found that the Etruscans would not join him, and that he could not take the fortified towns of the Romans, marched south, but was baffled by Fabius. In 216 the consuls, Varro and L. Æmilius Paulus, gave battle to Hannibal at Cannæ, and were routed with immense slaughter. Æmilius was killed. Varro succeeded in rallying some of the fugitives, and on his return to Rome was thanked for not despairing of the republic. The Romans showed much firmness, and took their measures with such promptitude and vigor that immediate danger was soon removed; but they never thereafter dared to meet Hannibal in a pitched battle while he remained in Italy. Most of southern Italy now

declared for Hannibal. The great city of Capua, which was almost capable of being the rival of Rome, opened her gates to him, and welcomed him as a deliverer. Had he been reinforced from home his purpose might have been accomplished; but at first it was impossible to send him assistance; and when it was sent, the time for success had passed away. Spain, whence he had expected aid, and where his brother Hasdrubal was in command, was invaded by the Romans, and partially conquered. The Romans gradually recovered ground. They retook Capua after a long siege, which Hannibal could not raise, though he marched to Rome for that purpose, and threatened the city. Marcellus invaded Sicily, and reconquered it. In Spain they were less fortunate, the brothers Scipio being there defeated and slain. Wherever Hannibal was present he was almost invariably successful. In 207 Hasdrubal entered Italy, having left Spain for the purpose of joining his brother; but he was defeated and killed at the battle of the Metaurus. The war in Italy was then virtually at an end, and Hannibal was forced to remain in Bruttium, but no Roman general durst meet him in the field. In Spain the war was renewed by P. Cornelius Scipio, then a young man, who completely ruined the Carthaginian cause in that country by the year 206. He was elected consul, with Sicily for his province, and had permission to carry the war into Africa, in accordance with the policy which he supported, but which was opposed by the old Roman leaders. Nothing happened in his consulship, but he was appointed proconsul, and it was resolved that he should retain his command until the close of the war. In 204 he invaded Africa, and his successes were so decisive that Hannibal was recalled, and the war was ended by the victory of the Romans at Zama, in 202. Peace was then made, Carthage accepting the humiliating terms dictated by the conquerors. Masinissa of Numidia, an ally of the Romans, was amply rewarded for his services.—Rome had now become a conquering nation, and in 200 B. C. she made war on Macedon, the king of which country had endeavored to assail her while she was engaged in the contest with Hannibal. She was victorious, Flamininus routing the army of Philip at Cynoscephalæ; she granted the vanquished moderate terms of peace, and nominally restored the Greeks to freedom, but really established her influence over Greece. A Syrian war was begun in 191, and ended with the defeat of Antiochus the Great at Magnesia, the Romans having entered Asia in 190. The Ætolians were reduced to submission, and the Galatians conquered without a declaration of war. The Italian Ligurians were also subdued, and the province of Cisalpine Gaul was created. In Spain the Roman dominion was greatly extended, so that nearly the whole peninsula acknowledged it for many years. Istria was reduced in 177. The last Macedonian war began in 171, and was closed in 3 years, by the vic-



tory of L. Æmilius Paulus over Perseus at Pydna. Rome was now virtual mistress of the East and the West, and protected Egypt against Syria, and ruled Greece through the tyrants that were established in her states. The legions crossed the Maritime Alps in 166, and took the first step toward the conquest of Gaul 12 years later. The Dalmatians were subdued in 155. A Macedonian rebellion was promptly quelled. The Achæan league was conquered in 146, and Corinth taken and destroyed; and Greece became a Roman province, called Achaia. The 3d Punic war, long urged by the elder Cato, was commenced in 149 and lasted 4 years, when Carthage was taken and destroyed by the second Scipio Africanus. The wars in Spain, having been renewed in 149, were brought to a close at the end of 16 years, by the siege and destruction of Numantia, the work of Scipio. Lusitania, too, was annexed after the assassination of its gallant defender Viriathus. The servile wars of Sicily broke out in 133, and the first continued two years. In Asia the Romans gained the kingdom of Pergamum, by will of its last monarch Attalus III. T. Gracchus became tribune in 133, and entered upon his course of agrarian legislation. His object was to create a new body of Roman commons, by reviving the Licinian laws, with some modification. Though this was in fact a war against property holders, it was not a war against property, as the rich had obtained a monopoly of the public lands in defiance of law. Some of the best of the Roman statesmen supported Gracchus, but the evil he purposed curing was too deep-seated to be removed by legal means. Nothing less than a revolution could have effected the change sought. During the long time that had elapsed since the passage of the Hortensian laws, there had grown up in Rome the party of the *optimates*, which was an exclusive aristocratical party, composed of both patricians and plebeians, and which enjoyed all the power of the state. The success of Gracchus would have been the destruction of this party; and its leaders opposed him, until he was driven to the adoption of unconstitutional means of resistance, when he was slain by some of their number, in an outbreak which they had caused. The contest between the aristocracy and the people had now begun. The younger Scipio for a time acted as a moderator between parties, but he was assassinated; and C. Gracchus resumed the projects of his brother, with additions, such as his law to distribute corn to the people, and another to transfer the judicial power from the senate to the equestrian order. He also purposed extending the Roman franchise. But he too failed, and was murdered in 121, while his adherents were put to death with every circumstance of illegality and cruelty. From this time reform became impossible, and revolution, through the aid of the legions, was inevitable. The few years that followed the triumph of the *optimates* form the most corrupt

period of Roman history. The effect of this corruption of the aristocracy was seen on the breaking out of the Jugurthine war, 111 B. C. The Roman armies were baffled through the arts of Jugurtha, who found their commanders accessible to his bribes, until first Metellus, and then C. Marius, were appointed to conduct the war against him. The election of Marius to the consulship was a triumph of the people over the *optimates*, and he opened the legions to a lower class of men, which was an important step toward that change which made them the instruments of successful leaders. Numidia was conquered in 107, and Jugurtha was starved to death. The invasion of the Cimbrians and Teutons led to the repeated reelection of Marius; and he justified his countrymen's confidence by exterminating those barbarians, after they had destroyed many Roman armies. The second servile war in Sicily, after lasting 3 years, was brought to an end in 99. The political contests of Rome now assumed a decisive character, and the failure of the Italians to obtain enfranchisement led to the social war (90,89), in which the Romans were victorious. The appointment of Sylla to the command in the war against Mithridates, king of Pontus, caused the rivalry between that chief and Marius to assume the form of a bloody civil war, the result of which was to throw the whole power of the republic into the hands of Sylla, who was appointed perpetual dictator, which office he resigned after having reconstructed the constitution according to aristocratic ideas. Sertorius, however, a partisan of Marius, having fled to Spain, for years braved there the best Roman generals, until removed by assassination. Sylla died in 78, and the changes that he had made lost their vitality with their creator. In the mean time, the conquests of the Romans had been carried on in the East by Sylla, and subsequently by Lucullus and Pompey, who overthrew Mithridates, and defeated the king of Armenia. Pompey converted Syria into a Roman province, and made Judæa virtually dependent upon the republic. The great servile war, in which the Thracian gladiator Spartacus headed the slaves, began in 73, and lasted nearly 3 years, much of Italy being in the hands of the slaves; and it was not until several powerful armies had been beaten, and forces of the greatest magnitude had been employed, that the insurgents were overthrown. Before his expedition to the East, Pompey subdued the Mediterranean pirates. The greatest man in Rome, Pompey had soon to encounter the rivalry of Julius Cæsar, while Cicero's services in exterminating Catiline and his supporters gave him a high degree of consideration, and the wealth and civil and military talents of Crassus enabled him to control a powerful party. Through a coalition, Cæsar, Crassus, and Pompey became virtual masters of their country; but the defeat and death of Crassus, in an expedition against Parthia, left supreme power to be struggled for by his associates. Cæsar had

been appointed to the command in Gaul, the conquest of which country he completed, while he also invaded Germany and Britain. Nominally as the champion of the senate, Pompey broke with Cæsar, who advanced upon Rome at the head of some of his legions, and compelled his enemies to fly. In the contest that followed, Cæsar was victorious, defeating his enemies, including Pompey, Ptolemy of Egypt, Pharnaces of the Bosphorus, Juba of Mauritania, the younger Cato, M. Scipio, and the sons of Pompey, in Italy, Spain, Greece, Egypt, Asia, and the province of Africa. He was the first of the emperors. Assassinated in 44, his power passed into the hands of his nephew Octavius, who, with the aid of Lepidus and Antony, triumphed over the republican party, whose chief leaders were Brutus and Cassius. Octavius soon mastered his associates, and became lord of the Roman world, the most important addition to which made by himself was the kingdom of Egypt. Drusus and Tiberius, his stepsons, conquered in Germany, but Varus perished there with his legions. Octavius (or Octavianus) was the second of the emperors, and his undivided rule dates from 30 B. C. He assumed the title of Augustus, by which he has ever since been known. All the powers of the state were centered in his person. His reign lasted until A. D. 14, and he was succeeded by Tiberius, his adopted son, who was of the Claudian gens, and in whose reign disappeared the last remnants of the old Roman constitution. Tiberius was succeeded by Caius, known as Caligula, who was a great-grandson of Augustus in the female line. After him reigned Claudius, and then Nero, the last of the emperors who could make any claim to connection, either by blood or by adoption, with the founder of the Julian imperial line. Tyranny and shameless corruption had reached their height. In the reign of Claudius Britain was conquered. The emperors Galba, Otho, and Vitellius followed each other in rapid succession, until the throne was occupied by the Flavian family in the person of Vespasian, who was succeeded by his son Titus, the conqueror of Jerusalem, whose successor was his brother Domitian. On this tyrant's assassination, the humane Nerva was made emperor, and reigned two years. His successor was Trajan, who added Dacia to the empire, and who carried the Roman arms to the Persian gulf, conquering many countries of the East; but these conquests were abandoned by the next emperor, Hadrian, who restored the Euphrates as the eastern boundary of the empire. Hadrian was succeeded by Antoninus Pius, whose heir was Marcus Antoninus. The 84 years of the reigns of Nerva, Trajan, Hadrian, and the two Antonines are considered the happiest period of the Roman empire; and it is from the year of the accession to the throne of Commodus, son of Marcus Antoninus, A. D. 180, that Gibbon dates the commencement of that empire's decline. At that

time the empire consisted of Italy, Spain, Gaul, Britain, Rætia, Noricum and Pannonia, Dalmatia, Mœsia and Dacia, Thrace, Macedonia, and Greece; Asia, Syria, Phœnicia, and Palestine; Egypt, Africa, and the Mediterranean with its islands. The population is estimated at 120,000,000. The emperor Commodus became one of the worst of the imperial tyrants, and was assassinated. His successor, Pertinax, was murdered by the prætorians, who sold the empire to Didius Julianus, to whom succeeded Septimius Severus. Severus's son Caracalla, and the successor of the latter, Elagabalus, rivalled Caligula and Nero in infamy. Most of the emperors who subsequently reigned were men of little ability, and their conduct accelerated the decline of the empire. Alexander Severus, Decius, and Aurelian are the principal exceptions, the last named conquering Zenobia and destroying Palmyra (A. D. 273). Under the rule of Diocletian the empire experienced some revival of its power; but the greatness of Rome scarcely belongs to that age, as the emperors had mostly abandoned the old city, and the constitution of the empire was assuming an oriental character. Constantine the Great, the first of the Christian emperors, formally transferred the capital to Byzantium, thenceforth called Constantinople, though its founder meant that it should be called New Rome. From that time, A. D. 330 (or 334), should be dated the cessation of the Roman ascendancy, though the remains of the empire continued to influence the world down to the middle of the 15th century, when Constantinople fell into the hands of the Turks. The Roman element was little known in the empire after the abandonment of the city on the Tiber, and that abandonment was the consequence of the change that had come over the world since the fall of the republic. Constantine only did that which other rulers had thought of, in transferring the seat of empire permanently to some other place than Rome, that transference simply rounding and completing the imperial policy which had been inaugurated by the first of the Cæsars. He divided the empire on his death between his three sons. Constantine II. inherited Gaul, and attempted to seize Italy, which had fallen to the share of his youngest brother Constans, but was slain in the attempt, and Constans, master now of both Italy and Gaul, was subsequently assassinated by his general Magnentius. The whole empire finally came into the possession of the second brother, Constantius (353), who on his father's death had been assigned the provinces of the East. The northern barbarians, having penetrated during this reign into Belgium and Alsace, were driven out by Julian, who succeeded to the purple in 361, restored paganism, and fell in 363 in an expedition into Persia. The army conferred the crown upon Jovian, who bought a disgraceful peace, and died before he reached Constantinople, leaving the selection of an emperor

again to the soldiers. The choice fell upon Valentinian I., who appointed his brother Valens his colleague, and left to him the government of the East, with a part of Illyricum. The weak and unfortunate reign of Valens (364-378) was signalized by the overthrow of the Goths by the Huns, and the establishment of the defeated tribe within the limits of the empire. Revolting in consequence of their ill treatment by the Romans, they were attacked by Valens in person, defeated him at Adrianople, and forced him to take refuge in a hut, where he perished by fire. More than 60,000 Roman soldiers fell in this battle, and the Goths ravaged the whole country from the scene of the conflict to the walls of Constantinople. In this moment of danger, the hopes of the East were turned on the court of Treves, where Gratian, the son of Valentinian I., ruled over the western division of the empire, while his younger brother, Valentinian II., governed Italy and Africa. Gratian chose as his colleague Theodosius, and caused him to be proclaimed emperor of the East (379). He himself, after a not inglorious reign (367-83), was assassinated in a military insurrection, and succeeded by Maximus, who soon turned his arms against Valentinian II. and drove him out of Italy. Theodosius in the mean time had restored peace to the East, and was now enabled to attack the usurper, defeated him on the banks of the Save (June, 388), and caused him to be put to death. Valentinian perished soon after at the hand of a Frankish assassin, and Theodosius, who merited from posterity the surname of Great, was acknowledged in 394 without a rival or colleague throughout the whole Roman empire. His death the following year plunged every thing again into confusion. The sovereignty was divided between his sons Arcadius and Honorius, and thenceforth there were two distinct empires, the further history of which will be found in the articles BYZANTINE EMPIRE and WESTERN EMPIRE.—The ancient city of Rome was situated principally on the left bank of the Tiber, about 16 m. from the sea, and just on the confines of Latium. From the Palatine hill, where it was originally founded, it spread over several adjacent eminences and the valleys between them, and became known as *urbs septi-collis*, the "city of 7 hills;" these were Mons Palatinus, Capitolinus, Esquilinus, Caelius, Aventinus, Quirinalis, and Viminalis. The Quirinal, Viminal, and Capitoline hills were occupied by the Sabines, and the Caelian, together with Mons Cispinus and Mons Oppius, which are parts of the Esquiline, by the Etruscans. The Aventine, lying without the *pomerium* or limit within which the *auguria* could be taken, was not always enumerated among the divisions of the city, though it lay within the walls. The first wall circumscribing the 7 hills was built by Servius Tullius. It was about 6 m. in circumference, and had, as far as can be ascertained, 19 gates. In some places the steep sides of the hills were a sufficient protection without

artificial fortification; in others the wall is known to have been over 60 feet high and 50 feet wide, faced exteriorly with flag stones and bordered by a ditch, and traces of it are still visible. The city was divided by Servius Tullius into 4 *regiones*, corresponding to the 4 tribes in which the citizens were classed; they were named Suburana, Esquilina, Collina, and Palatina. The Capitoline, as the seat of the gods, was not included in them. Augustus increased the number of *regiones* to 14, comprehending beside the city of Servius Tullius the suburbs which had since grown up. Each *regio* was subdivided into *vici*. At what time the Mons Janiculus on the right bank of the Tiber was encompassed by walls seems doubtful; it was fortified and connected with the left bank by a bridge as early as the time of Ancus Martius, but the Transtiberine district, as it is called, was hardly a part of the inhabited city. The emperor Aurelian built a new wall, which took in the Mons Janiculus, and on the opposite bank swept on all sides far beyond the walls of Servius Tullius. It was 11 m. in circuit, and according to Procopius had 14 large and several smaller gates. There were 8 bridges across the Tiber, 2 of which, the Pons Fabricius and Pons Cestius, are still standing; they are now called Ponte Quattro Capi and Ponte S. Bartolommeo. The number of streets is said to have been 215, the principal avenues being called *vias* and *vici*, and the narrow ways *angiportus*. The main thoroughfare was the Via Sacra, which began in the valley between the Caelian and Esquiline mounts, and wound in a rather devious course westward, past the Flavian amphitheatre and under the arch of Titus, through the centre of the city to the capitol. The Via Lata and its continuation the Via Flaminia extended from the N. side of the capitol to the Porta Flaminia near the N. W. angle of the city. The Vicus Tuscus, running out of the Forum Romanum, contained many of the shops, and was celebrated by Horace for the rascally character of its inhabitants: *Tusci turba impia vici*. The Vicus Sandalarius was the spot where shoemakers congregated, and also the quarter of some of the booksellers. The whole valley between the Esquiline, Quirinal, and Viminal hills, lying a little to the N. E. of the centre of the city, was called the Subura, and through it ran a street of the same name. This was the scene of most of the bustle and wickedness of the city, and the seat of the principal shops and brothels. The Carinae, a district just without the limits of this noisy region, was the residence of Pompey, Cicero, and many other distinguished persons. Here and there were open places called *fora* and *campi*, the former being intended for the transaction of business, and the latter for pleasure grounds. The *fora* were level spaces of oblong form, paved, and surrounded with buildings of various kinds, and were either *fora civilia*, where justice was administered and other public matters attended to, or *fora venalia*, which answered very nearly

to modern market places. The Forum Romanum, sometimes called simply the forum, or *forum magnum* or *vetus*, occupied a space between the Capitoline and Palatine hills, and was the most important of the 19 Roman fora. (See *FORUM*.) Among the others were the Forum Julium or Cæsaris, close behind the former; the Forum Augusti; the Forum Nervæ or *transitorium*, intended merely as a passage way from the two preceding to the temple of Peace; and the Forum Trajani, which was the most magnificent of all. Portions of this last still remain. The *campi* were not unlike modern parks, being planted with grass and trees and adorned with works of art. The largest and most celebrated was the Campus Martius, lying to the N. W. of the city of Servius Tullius, between the walls and the Tiber. (See *CAMPUS*.) The Campus Sceleratus was the spot where vestals who had violated their vows were buried alive, and the Campus Esquilinus was originally used for the execution of criminals and the burial of the poor, though the greater part of it was afterward converted into pleasure grounds. Beside these places of public resort, there were beautiful private parks and gardens on the hills around the city.—The houses of Rome were divided into two classes, the *domus*, or residences of the nobles, corresponding to the modern *palazzi*, and the *insulæ* or dwellings of the middle and lower classes, which were often let out by floors or apartments after the modern fashion. These *insulæ* were sometimes carried up so many stories that a law was passed forbidding any house to be built over 60 feet high—a regulation all the more necessary as every house was surrounded by an open space of at least 5 feet. The *domus* had porticos in front and inner courts called *atria*. The *insulæ* perhaps had smaller courts within, and in place of the porticos they had open spaces which served for shops and workshops. The common building material was brick, at least before the time of Augustus; the upper story was generally of wood. Under the emperors more costly materials, such as marble and other stone, came into frequent use; and when Nero rebuilt the city after the great fire he employed a kind of volcanic rock called *peperino*, formed by the cementing together of sand and cinders. He also dispensed with the wooden upper story, and took pains to make the streets wide and straight. Most of the *domus* were situated at the E. end of the city on the Quirinal, Viminal, and Esquiline hills; they did not form streets, but were built in the midst of large gardens and fields. The city is supposed to have reached its greatest size in the time of Vespasian, when it was 18 m. in circuit, and embraced a population probably not much under 2,000,000, of whom about  $\frac{1}{3}$  were slaves.—The public edifices during the palmiest days of the empire were of almost unparalleled magnificence. The whole plain between the Quirinal and the river was one mass of splendid buildings, among which there

were no private houses; and in the valley which lay between the Esquiline, Viminal, and Quirinal on the one side, and the Caelian, Palatine, and Capitoline on the other, there was a close succession of stately structures of almost every description. The capitol was on the mount to which it gave its name. (See *CAPITOL*.) The imperial palace was situated on the N. E. side of the Palatine hill, and the approach to it was from the Via Sacra near the arch of Titus. Originally the residence of the orator Hortensius, it was enlarged and occupied by Augustus, and again enlarged by Caligula. Nero built a magnificent palace, known as the *domus transitoria Neronis*, which covered the whole Palatine hill; and when this was destroyed in the great conflagration, he commenced the erection of another, the famous golden house, which embraced the whole of the Palatine, a great part of the Esquiline, and the valley between them, the Via Sacra and other streets passing through it. It was not finished until the time of Diocletian, and in the mean time Vespasian had restricted the imperial residence to the portion situated on the Palatine, converting the rest of it to other uses. The residences of Cicero, Pompey, and Crassus are also classed among the palaces; that of Scæurus, afterward occupied by Clodius, was famous for its magnificence; and that of the family of the Plautii Laterani, which stood on the site of the modern Lateran palace, became the palace of Constantine, who lavished decorations upon it. There were several senate houses or *curiæ*, the oldest of which was that built by Tullus Hostilius, and hence called the Curia Hostilia. It stood in the forum, and was the ordinary place of meeting of the senate down to the time of Julius Cæsar, when it was destroyed to make room for a temple of Fortune, and a new one called the Curia Julia was built near the same spot. The Curia Pompeia in the Campus Martius was the scene of Cæsar's assassination. The Curia Pompiliana, near the temple of Janus, was built by Domitian and restored by Diocletian. The chief places of meeting for merchants, as well as the seats of the courts of law, were the basilicas, perhaps the most noteworthy of which was the Basilica Fulvia in the forum, built in 179 B. C., and restored in the reign of Augustus after it had been destroyed by fire. (See *BASILICA*.) Other places of resort for business or recreation were the porticos, some of which were extremely magnificent. The Porticus Argonautorum was so called from a celebrated painting of the Argonauts; that of Octavia was a splendid building, containing a public library and a collection of works of art; the senate often met in it. There were two public prisons; the more ancient, known as the Mamertine, was built by Ancus Martius on the slope of the Capitoline, and enlarged by Servius Tullius, who constructed a deep subterranean dungeon; the other was called Carcer Lautumia. The military were quartered in two large camps,

the *castra prætoria* at the N. E. extremity of the city, beyond the walls of Servius Tullius, and the *castra peregrina*, on the Cælian hill. The former, built by Tiberius, was occupied by the prætorian guards, and the latter by foreign legions. The aqueducts, the most stupendous works of their kind in the world, and the sewers, the chief of which, called *cloaca maxima*, is still in excellent preservation, are described elsewhere. (See *AQUEDUCT*, and *CLOACÆ*.) Scarcely surpassed by any of the public edifices were the *thermæ* or baths, whose name conveys but a very imperfect idea of the various uses to which they were devoted. Beside the apartments for bathing (see *BATH*), they contained places for athletic exercises, public halls, vestibules and porticos for lounging and conversation, shaded walks and gardens, fountains, libraries, and collections of paintings and sculptures. The *thermæ* of Antoninus, built principally by Caracalla and completed by Alexander Severus, had accommodations for 2,800 bathers at the same time, and the *thermæ* of Diocletian for 3,000. The latter was the most extensive building of the kind in Rome. Those of Agrippa or Alexander Severus, Nero, Titus, Trajan, Commodus, and Constantine were also celebrated; and there were several smaller ones, beside a great number of *balneæ* or common baths. There were only 3 theatres proper, those of Pompey, Cornelius Balbus, and Marcellus, but these were all of stupendous size. The first was situated in the Campus Martius, and had seats for 40,000 spectators; the second, near the Tiber, where the Cenci palace now stands, could contain 11,600 people; and the third, in the S. part of the Campus Martius, between the Capitoline and the river, could hold 20,000. The first theatres were mere temporary structures of wood, though even these were sometimes of extravagant splendor, like that upon which M. Æmilius Scaurus wasted an enormous fortune, and which was large enough to seat 80,000 spectators. The stage was decorated with 360 columns arranged in 3 stories, the lowest of white marble, the middle of glass, and the uppermost of gilt wood. The *odeum* in the Campus Martius was a sort of music hall, and was capable of accommodating 11,000 persons. The circus dates its introduction into Rome long prior to the erection of permanent theatres. (See *CIRCUS*.) Amphitheatres, for gladiatorial combats and shows of wild beasts, were at first built of wood and taken to pieces after the performances were over (see *AMPHITHEATRE*); the first stone edifice of the kind was erected by Statilius Taurus in 80 B. C. Another was begun by Caligula, but never finished. The great Flavian amphitheatre, better known as the Colosseum from a colossal statue of Nero which stood near it, was begun by Vespasian, and finished by Titus in A. D. 80. Similar in character to the amphitheatres were the *naumachis* or places for the representation of sea fights, three of which are known to have been con-

structed, one by Julius Cæsar, another by Augustus, and the third by Domitian. They consisted of artificial lakes with stone seats ranged around them for the accommodation of spectators. Of temples and similar religious edifices there are said to have been as many as 400. The finest of all was the temple of Jupiter Tonans on the Capitoline hill (see *CAPITOL*); the oldest that of Jupiter Feretrius, built, it was said, by Romulus, and restored by Augustus. The famous temple of Janus, which was closed in peace and opened in war, was situated N. E. of the forum, toward the Quirinal; it was properly not a temple, but a passage way with gates at each end. The temple of Diana on the Aventine was built by Servius Tullius as a place of meeting for the Romans and the members of the Latin league. The temple of Concord, in which the senate sometimes met, stood on the slope of the Capitoline, overhanging the forum; in that of Bellona the senators gave audience to ambassadors, and heard the applications of victorious generals for the honor of a triumph; the vast temple of Venus and Rome, sometimes called simply *templum urbis*, was a magnificent building between the Esquiline and Palatine. The temple of the sun on the Quirinal was raised by Aurelian or by Elagabalus; it was a colossal edifice in the Corinthian style, elaborately decorated, and was visible from nearly all parts of the city. The temple of Nerva in the forum of Nerva was one of the most elegant and correct in style and richest in its details. The temple of the *divus Rediculus* was a handsome building of red and yellow brick outside the walls on the Appian way. There were several shrines of Vesta, one of which, a chaste Grecian building in the Forum Boarium, had a portico of 20 Corinthian columns of Parian marble. There were several temples of Fortune, including one of *Fortuna Virilis* on the banks of the Tiber, constructed of travertine stone and tufa, and covered with a fine, hard marble stucco. The temple of Peace, sometimes called the basilica of Constantine, on the Velia, consisted of 3 naves with great arches and vaultings, marble cornices and stucco work, and was one of the handsomest in Rome. The Pantheon was dedicated, according to common belief, to all the gods, though Dion Cassius states that it was sacred to Mars and Venus. (See *PANTHEON*.) Prominent among the other remarkable features of the city were the triumphal arches thrown across the principal streets by generals in commemoration of their victories; 21 are mentioned, of which the most important are the arch of Titus, on the Via Sacra, of Pentelic marble, built to celebrate the capture of Jerusalem, and still standing; the arch of Septimius Severus, of the same material, at the entrance of the Via Sacra into the forum; the arch of Constantine at the mouth of the valley between the Palatine and Cælian hills, with 3 archways, adorned with beautiful columns, bass-reliefs, and statues, erected to commemo-

rate the victory over Maxentius; and the arches of Dolabella, Gallienus, and Drusus. The most interesting of the columns erected in various parts of the city are described under the titles COLUMN and OBELISK. The mausoleum of Augustus, in the Campus Martius, surrounded by a large park, was built by Augustus as the burial place of the imperial family, and was one of the most magnificent edifices of his reign. The mausoleum of Hadrian is now the castle San Angelo. The tomb of the Scipios was discovered in 1780; and among the other most imposing sepulchral monuments were the tombs of Cæcilia Metella, Cestius, and Septimius Severus.—The modern city occupies very nearly the same space as the ancient; lat. of the observatory of the Collegio Romano,  $41^{\circ} 53' 52''$  N., long.  $12^{\circ} 28' 40''$  E.; pop. in 1846, 180,000; in 1852, 175,838; in 1858, 180,359. The Tiber has a course within the walls of about 3 m., and is crossed by 5 bridges, viz.: the Ponte S. Angelo, the ancient Pons Ælius, opposite the castle of S. Angelo at the N. W. end of the city; the Ponte Sisto, built by Sixtus IV. in 1474 on the ruins of the Pons Janiculensis, connecting the city proper with the quarter of Trastevere; the Ponte di Quattro Capi (so called from a 4-headed statue of Janus), the ancient Pons Fabricius, and the Ponte S. Bartolommeo, the ancient Pons Cestius, connecting the Isola di S. Bartolommeo, the former with the city, and the latter with the Trastevere; and the Ponte Rotto, on the site of the ancient Pons Æmilius; this last was partly washed away in 1598, and a suspension bridge now extends from the remaining portion to the shore. The ruins of the old Pons Triumphalis and Pons Sublicius are visible when the water is low. The walls are nearly 13 m. in circuit, those on the left bank of the river following the line of the wall of Aurelian; they have been so often repaired that it is difficult to assign a date to any portion of them. On the outside they are 50 feet high, on the inside generally less than 30. They have no ditch, but are crested with about 300 towers and pierced by 13 gates, beside which there are 7 gateways now walled up. The general level of the city has been considerably raised by the rubbish accruing from long habitation and from the ruins of ancient edifices, so that the lower parts are estimated to be at least 15 feet higher than they were in the days of the Cæsars. It is on the low land that the modern city is chiefly built, the hills being mostly covered with vineyards, cornfields, and villas. The closely built part is about 2 m. in length, with a breadth of from 1 to  $1\frac{1}{2}$  m. Many of the streets are long, but they are mostly narrow and crooked. They have seldom any foot pavement, and are often filthy, and present in their architecture a mixture of magnificence and meanness, stately palaces and churches alternating with miserable huts. The 3 finest streets diverge from a square called the Piazza del Popolo near the N. gate. These are: 1, the

Corso, which extends to the foot of the capitol and is a mile in length, perfectly straight, 50 feet wide, with foot pavements on each side; it is the great public walk of the city; 2, the Strada del Babuino, which runs to the Piazza di Spagna; 3, the Strada di Ripetta, which leads to the Tiber. The houses of Rome are generally lofty, and are mostly built of brick and tufa, marble being less commonly used than in the cities of N. Italy. The city is divided into 14 *rioni* or quarters, corresponding in number to the 14 regions of Augustus, but not resembling them in size or situation; 12 of these divisions are on the left bank and 2 on the right bank of the river. 1. The Rione de' Monti is the largest quarter, containing, among other public buildings and monuments, the column of Trajan; the church of St. John Lateran, the chief church of the city in point of antiquity and ecclesiastical dignity; the church of Sta. Bibiana, which covers the relics of 5,260 martyrs; the splendid church of Sta. Maria Maggiore, with the Sistine and Borghese chapels; the villas Albani and Borghese, and the ruins of the baths of Titus and Diocletian. 2. The Rione di Trevi contains the Corso; the Piazza di Monte Cavallo, in which stand two colossal antique statues of horses; the Quirinal, the pope's ordinary residence; the palace Della Consulta; and the magnificent Barberini palace, rich in treasures of art and literature. 3. In the Rione di Colonna stand the column of Antoninus, the Pantheon, the palace of the propaganda, and the Piazza di Spagna, one of the finest squares of the city. 4. In the Rione di Campo Marzo, so called from its principal place, the ancient Campus Martius, are the Piazza del Popolo and the Porta del Popolo, a magnificent work of Michel Angelo. 5. The Rione di Ponte contains one of the finest streets in Rome, the Strada Giulia. 6. The Rione di Parione contains the palaces Orsini and Pamfili, the theatre Della Pace, and the place Pasquino, where formerly stood the statue of Pasquin. 7. The Rione della Regola contains the churches of S. Girolamo della Carità and S. Tommaso, the English college, and the celebrated Farnese palace. 8. The Rione di S. Eustachio contains the church of S. Eustachio, the university, and most of the shops and manufactories. 9. The Rione della Pigna contains the beautiful Dominican convent and church of La Minerva. 10. The Rione de' Campitelli or del Campidoglio contains the Tarpeian rock and the Capitoline hill, on which is the capitol, an edifice chiefly remarkable for the collections of art within its walls. Here too is the Campo Vaccino, the ancient forum, among whose ruins are the arches of Severus and Titus, the temples of Peace and of the sun and moon, and the greatest of Roman ruins, the famous Colosseum. 11. The Rione di S. Angelo contains the fish market and the Ghetto or quarter of the Jews. 12. The Rione di Ripa contains the Monte Testaccio, the pyramid of Cestius, the burial place

of Protestants, the church of St. Paul's, the largest in Rome except St. Peter's, and an antique arch near which are still seen the tombs of the Scipios, of the Horatii and Curiatii, and the circus of Caracalla. 13. The Rione Trastevere, the ancient Janiculum, on the W. side of the Tiber, contains the great fountain of Aqua Paula, a botanical garden, the Villa Corsini, and the church of S. Pietro in Montorio. 14. The Rione di Borgo contains the castle of S. Angelo, the citadel, whose centre or nucleus was the mausoleum of Hadrian. This castle is now of little importance as a fortress, and is chiefly used as a state prison. It communicates by a long covered gallery with the palace of the Vatican, an immense edifice, 1,300 feet long and 1,000 feet broad, almost unrivalled for its internal splendor and magnificence. Among its treasures of art are the tapestry chambers, hung with tapestry copied from the cartoons of Raphael; a picture gallery filled with masterpieces; the *camere* and *loggie*, painted in fresco by Raphael and his pupils; the Sistine and Pauline chapels, painted in fresco by Michel Angelo; the great Museo Vaticano, and in it the Belvedere, an octagon court surrounded by porticos and cabinets in which are the Apollo, the finest statue in the world, and the Antinous, the Perseus, the "Two Boxers," and the Laocöon. The Vatican also contains Raphael's "Transfiguration" and Domenichino's "Communion of St. Jerome." It has also an immense library, the halls and galleries of which are more than 1,300 feet in length, and which is peculiarly rich in rare manuscripts. In the museum of the capitol are some of the finest remains of ancient sculpture, among others the "Dying Gladiator," the "Fighting Gladiator," the two Furietti centaurs, the Cupid and Psyche, the Agrippina, the Camillus, the Venus of the capitol, and the famous bronze wolf with the infants Romulus and Remus. Many other celebrated statues and pictures adorn the churches and palaces of the city; and beside the great collection of the Vatican there are 10 or 11 public libraries, one of which, called the Angelica, in the Augustinian convent, contains 90,000 volumes and 3,000 MSS., and another, the Minerva, 120,000 volumes and 4,500 MSS.—There are in the city 364 churches and 186 convents. Preëminent among these sacred edifices, and among all the Christian temples of the world, is the church of St. Peter's, which Gibbon calls "the most glorious structure that has ever been applied to the use of religion." Its foundation was laid by Pope Nicholas V. in 1450, on the site of an ancient basilica, and after a period of construction carried through the reigns of 20 popes and directed by 12 architects, among them Bramante, Raphael, Michel Angelo, Giacomo della Porta, and Maderno, it was dedicated by Urban VIII. in 1626. (See CATHEDRAL.) Externally the work, though magnificent in materials and dimensions, is disfigured by the prominence of the front add-

ed by Maderno, which almost hides from the near spectator the principal feature, the vast and towering dome; while, had the original plan of Bramante and Michel Angelo been followed, the whole dome would have been visible from the square before the church. But the dome itself and the interior of the edifice are held to be unrivalled in magnitude, proportion, and decoration. The church of St. Paul "outside the walls," destroyed by fire in 1823 and rebuilt and dedicated in 1854, is also a masterpiece of magnificence in architecture and decoration. It was originally founded by the emperor Constantine. The palaces of the Roman nobles are numerous and of great size, but are generally more remarkable for internal than for external splendor. Their walls are usually of brick stuccoed, and their chief external ornament is a rich cornice. The principal of these mansions are those of Doria, Ruspoli, Corsini, Orsini, Giustiniani, Altieri, Cicciaporci, Farnese, Barberini, and Colonna. There are several palaces which, from being surrounded by extensive gardens, are called villas. Of these the principal is the villa Borghese, whose gardens, nearly 3 m. in circuit, are open to the public, and form the most fashionable promenade in Rome.—There are many squares in the city, consisting of small paved areas, adorned generally with fountains and monuments. The large oval area in front of St. Peter's is surrounded by a superb colonnade, and in the middle between two fountains is an Egyptian obelisk 78 feet in height. The square next in size to that of St. Peter's is the Piazza Navona, which is about 840 feet in length, and has in the centre an elegant fountain, the finest in Rome. These fountains are numerous throughout the city, and form one of its most striking and attractive features. They are copiously supplied with water by three aqueducts which yet remain in operation of the many that poured their streams into the ancient city.—The Colosseum is the most striking of the remains of old Rome. Its form is elliptical; there are 4 stories adorned by columns; the lower is Doric, the 2d Ionic, the 3d Corinthian; the height of the outer wall was 157 feet; the longer axis, 620 feet; the shorter, 513; circumference, 1,770 feet; area, 6 acres. The material of which it is built is chiefly travertine. It has been stripped of its exterior ornaments, the interior wholly dismantled, and much of the outer wall carried off for the sake of the materials; and yet it remains a most imposing and sublime ruin from the mere grandeur of its size. The Pantheon is the most perfect as a whole of the structures that remain of the ancient city. The portion of the baths of Diocletian which remains has been converted into a convent; the principal hall forms the convent church. The chief triumphal arches are those of Titus, of Septimius Severus, and of Constantine, the last of which is the only one that remains entire. Trajan's pillar is a column covered with bass-reliefs containing 2,500 figures



representing that emperor's expedition against the Dacians; its height is 133 feet. A pillar of nearly equal height erected in honor of the emperor Marcus Aurelius stands in the Piazza Colonna. Beneath the city are extensive catacombs, which were originally excavations made in digging out materials for building. (See CATACOMBS.)—The manufactures of Rome are various, though not extensive. The principal are of woollens, silks, velvets, hats, gloves, stockings, leather, glue, glass bottles, liquors, pomade, artificial flowers, mosaics, jewelry, and articles connected with the fine arts. The city is a great resort for foreigners, of whom the English, French, and Americans are the most numerous, and is a favorite place of residence and study for foreign artists. The climate is mild, but relaxing and oppressive in summer. Rains are frequent and heavy in November and December, and there is usually a little snow in the winter, which however seldom remains more than a few hours. The *tramontana*, a disagreeable cold north wind, sometimes blows for several days at a time. The marshy grounds in the neighborhood of the city and thinly populated districts in and around it are malarious and apt to produce remittent fevers, which however can be easily avoided by care and prudence. The people of Rome, at least the middle and working classes, are stout and well formed, the women being remarkable for beauty and a certain majesty of air and mien. The public amusements are theatrical performances, concerts, and religious celebrations. The most noted festival is the carnival, which immediately precedes the season of Lent. The chief educational institution is the university, which has 8 professors in theology, 6 in law, 8 in medicine, 5 in philosophy, one in the fine arts, and 4 in the Greek, Hebrew, Syriac, and Arabic languages. The college *de propaganda fide* has a rich library and a printing office which contain works in 30 languages. There are several other colleges and many learned societies, the principal of which are the academies of Roman history, of geography, of ecclesiastical history, of antiquities, and of the Arcadians. The municipal government is in the hands of a senator appointed by the pope, and 8 conservators and 40 councillors elected by their own body, together with two delegates from each of the 14 *rioni*. Their term of office is 6 years, and one half of the body is taken from the nobility and landowners, and the other half from the middle classes.—During the turbulent and ignorant ages which succeeded the downfall of the western empire, the city of Rome slowly sank to a state of degradation and decay, which reached its greatest depth about the end of the 8th century, when little more remained of the proud metropolis of the world than is now visible, while the modern city was not yet begun to be constructed. The population at this period is supposed to have dwindled to about 13,000. The popes however soon began to assert their supremacy over the

potentates around them, and exerted themselves to restore and enlarge their capital. Leo VI. made a large accession to the city about 850, and under the influence of peace and stable government the population rapidly increased. In the 11th century the city suffered severely from the attacks of the emperor Henry IV. in his wars with Gregory VII., and still more from the Normans and Saracens under Robert Guiscard, who recovered it for the pope from the hands of the imperialists. Still at the end of this century its population had grown to 35,000. In the 14th century the prosperity of the city was checked by the removal of the popes to Avignon, and was not materially promoted by the brief splendor of the rule of Rienzi. After the return of the popes in 1377, a long period of turbulence and civil strife succeeded, in which the families of the Colonna and Orsini were the principal actors; but at length, about 1417, the authority of the popes prevailed, and during the 15th and 16th centuries the city was enlarged to nearly its present dimensions and adorned with its principal churches and palaces. By the middle of the 17th century it had attained its highest state of population and magnificence. The only great calamity which befell it during these last 3 centuries was the storming and pillaging by the army of the constable de Bourbon in 1527. In 1797 Rome was occupied by the French, who sent the pope to France, and proclaimed a republic, which was suppressed by the allies in 1799 and the pope restored. In 1808 the city was again occupied by the troops of Napoleon, and in the following year annexed to his empire. The pope was restored on the downfall of Napoleon in 1814, and the city remained in peace till in 1848 revolutionary movements began, which resulted in the expulsion of the pope and the establishment of a republic in Feb. 1849, at the head of which were Mazzini, Armellini, Saffi, Garibaldi, and Avezzana. The new republic however was speedily suppressed by the French army, which besieged Rome during May and June, 1849, and compelled it to surrender July 1. The city has since been occupied by a French garrison. Its possession is ardently desired by the statesmen of the new kingdom of Italy, of which it is thought to be the appropriate capital.

ROMILLY, SIR SAMUEL, an English lawyer and statesman, descended from a French Protestant refugee, born in London, March 1, 1757, died by his own hand, Nov. 2, 1818. He acquired a liberal education mainly by self-instruction, and was called to the bar in 1783. While a student at law he had visited Geneva, where he became acquainted with Dumont, and at Paris with D'Alembert, Diderot, and several of those who were afterward prominent leaders of the French revolution. These associations and subsequent visits to Paris led him to view the revolution with a favor which he manifested in several pamphlets, and in an

extensive correspondence which has since been published. His practice at the bar was at first meagre, but before 1806 he had attained the position of the most successful advocate since the time of Coke, and the largest practice of any barrister in the court of chancery. In that year he was appointed solicitor-general in the Fox and Grenville ministry, and returned to parliament for a government borough, though he had previously from a desire for independence refused offers of a seat from the marquises of Lansdowne and the prince of Wales. He was one of the managers on the trial and impeachment of Lord Melville, and effected improvements in the bankrupt laws, but is most distinguished for his efforts to ameliorate the criminal laws, to which he applied himself after retiring from office on a change of ministry in 1807. More than 20 years before he had, at the instance of Lord Lansdowne, written a reply to a pamphlet advocating a more stringent execution of those laws, by which nearly 300 offences were then punishable with death, and had since devoted much attention to the subject. Retaining his seat in parliament during the remainder of his life, at each session, beside taking a leading part in general legislation on the liberal side, he introduced bills for the repeal or modification of the worst statutes, and, though generally unsuccessful, gave an impulse to public sentiment which finally effected his object at a later period. Up to 1818 he had sat for "pocket boroughs," the representation of which he purchased from their owners. In that year, however, he was without solicitation returned for Westminster; but before the session commenced, grief for the death of his wife and other excitements produced an aberration of mind under which he committed suicide. He left an autobiography, since published under the title of "Memoirs of Sir Samuel Romilly" (3 vols., London, 1840).—**SIR JOHN**, son of the preceding, born in 1802, was appointed solicitor-general in 1848, attorney-general in 1850, and master of the rolls in 1851, which last office he still holds (1861).

**ROMNEY, GEORGE**, an English painter, born in Furness, Lancashire, Dec. 15, 1734, died in Kendal, Nov. 15, 1802. He was the son of a cabinet maker, and was placed when 19 years old with an itinerant painter who was then practising his profession at Kendal in Westmoreland. At the age of 23 he began painting on his own account, resided some time at York, and in 1762 established himself in London. Here he began by painting heads for 4 guineas, and in 1763 obtained the second premium of 50 guineas, offered by the society of artists, by a picture of the "Death of Gen. Wolfe." In 1765 he gained a second premium from the same society for a historical painting; but he devoted himself chiefly to portraits. In 1773 he went to Italy, and remained there about 2 years, studying in particular the works of Michel Angelo and Raphael. After his return in 1775 he was constantly occupied with portraits,

and was soon under the necessity of raising his prices. He did not belong to the royal academy, and sent no pictures to its exhibition; moreover there was an ill feeling and rivalry between himself and its president, Sir Joshua Reynolds. "Reynolds and Romney," Lord Thurlow is reported to have said, "divide the town; I am of the Romney faction." At the same time he began to employ himself more and more with ideal and historical pieces, but he rarely finished the many works of that class which he commenced. In 1756 he had contracted a marriage with a young woman at Kendal, but in setting out for the metropolis left her and two young children in that place, and during his subsequent years of prosperity never called her to share his fortunes, and even concealed from his friends the fact of his marriage. But as his health declined, he in 1799 suddenly started for the north, and there in her society spent the remainder of his life. The year after his arrival at Kendal he became utterly imbecile, a condition which he had long dreaded, and in which he continued until his death. Cumberland, the dramatist, gave a short account of his history; the poet Hayley published a biography, in which Flaxman gave a description of his works; his son, the Rev. John Romney, wrote another life; and a notice can also be found in Allan Cunningham's "Lives of the British Painters."

**ROMULUS**, the founder of Rome, reigned from 753 to 716 B. C. The following is the legendary account of his history. Amulius, the younger son of Procas, king of Alba Longa, after the death of his father seized on the throne rightfully belonging to his brother Numitor, and caused the daughter of the latter, Rhea Silvia, to become a vestal virgin. By the god Mars, who fell in love with her, she had two children, who as soon as they were born were ordered by Amulius to be thrown into the water. Happily the river had at that time overflowed the surrounding country, and the basket in which the boys Romulus and Remus were placed was carried to the foot of the Palatine hill, and left on dry land. A she wolf, going down to the water to drink, was attracted by the cries of the children, carried them to her cave, and suckled them; and in this situation they were found by Faustulus, the king's herdsman, who took them home, and brought them up along with his own sons. When they had grown up, the herdsmen of the Palatine hill had a quarrel with the herdsmen of Numitor, in which Remus was taken prisoner, and the expedition of Romulus to deliver his brother resulted in the discovery of their birth, the killing of Amulius, and the elevation of Numitor to his rightful authority. The two brothers determined to build a city on the Palatine, on which they had been brought up; and in order to decide which one should give his name they consulted the augurs. First there appeared to Remus 6 vultures, and then to Romulus 12. A dispute then arose between the two,

but most of the people gave their voices for Romulus, who thereupon began building the city. Remus, angry at the decision, leaped over the rampart, saying: "Shall such defences as these keep your city?" and was instantly slain. Romulus, to increase the number of citizens, opened a place of refuge, and thither many fled from the countries round about; but they were without wives, as the neighboring people would not give them their daughters in marriage. Hereupon the king made a great festival, which was largely attended by the men of the neighboring cities with their families; while they were looking upon the sports, the Roman youth rushed out and carried off the women to be their wives. In consequence a war arose, first with the people of Cœnina, then with the people of Crustumium and Antemnæ, in both of which Romulus was successful; and lastly with the Sabines, who came with a great army under their king Titus Tatius. Through the treason of Tarpeia, the Sabines got possession of the fortress on the hill Saturnius, and a battle ensued in the valley at the foot of the hill. While it was raging fiercely, the women who had been carried off ran down from the Palatine, threw themselves between their husbands and their fathers and brothers, and prayed them to lay aside their quarrel. A peace was therefore made between the contending armies, and the two peoples became one, the Sabines living on the Saturnius or Capitoline and the Quirinal hills, and the Romans on the Palatine; and the two kings and their counsellors met in the valley between the Palatine and Capitoline hills, which was therefore called *comitium*, "the place of meeting." Tatius not long afterward was slain by the inhabitants of Laurentum, and Romulus reigned over the whole people. These he divided into 3 tribes: the Ramnenses, from his own name; the Titienses, from that of the Sabine king; and the Luceres, from Lucumo, an Etruscan chief who had aided him in previous wars. Romulus had numerous wars, in which he was very successful. After he had reigned a long time, he one day called the people together in the field of Mars. When they had assembled, there arose a terrible storm, which darkened the land and dispersed the people, and in the midst of it Romulus disappeared. At first it was not known what had become of him, but that night he appeared to one Proculus Julius coming from Alba to Rome, and said to him: "Go and tell my people that they weep not for me any more; but bid them to be brave and warlike, and so shall they make my city the greatest in the earth." From that the people judged that Romulus had become a god, and a temple was built to him, and he was worshipped under the name of Quirinus. He was succeeded by Numa Pompilius.

RONCESVALLES, or RONCESVAUX, a small hamlet situated in the valley of Valcarlos in Navarre, between Pampeluna and St. Jean Pied du Port in France. It commands the en-

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trance to one of the passes of the Pyrénées, and is celebrated as the scene of the "dolorous rout" of Charlemagne, who, returning from an invasion of Spain, was attacked by the Basque mountaineers and lost his whole rear guard, A. D. 778. Tradition has added so largely to the incidents of this battle, that it is now very difficult to separate fact from fiction; and the numerous local ballads and romances of the middle ages, in which are related on one side the exploits of the legendary Spanish hero, Bernardo del Carpio, and on the other those of Roland, Oliver, and the other "peers and paladins" of Charlemagne's court who fell in the encounter, have given a character to the place which history cannot easily remove. One of the most imaginative accounts of the battle is that contained in Pulci's *Morgante Maggiore*. A cleft in the highest part of the mountain chain, called the Brèche, was, according to tradition, made by Roland with his sword Durandal. Through this pass the Black Prince led his army into Spain in 1387; and in July, 1813, Soult was forced from a strong position he had taken here by Wellington.

RONDA, a city of Andalusia, Spain, 40 m. W. from Granada, and 48 N. N. E. from Gibraltar; pop. about 18,000. It is built upon a high rock, nearly surrounded by the river Guadiaro, which separates the town by a deep chasm, crossed by two bridges, into two parts. It is protected by a Moorish castle.

RONDO (It.), in music, a composition consisting of 3 strains, the first of which, forming the burden, closes in the original key, while the others lead the ear easily and naturally back to it. The piece derives its name from the circumstance of the melody going round through the 2d and 3d strains to the 1st.

RONGE, JOHANNES, the leader of the German Catholics, born in Bischofswalde, Silesia, Oct. 16, 1813. He studied theology at the university of Breslau from 1837 to 1839, and was ordained as a Roman Catholic priest in 1840. Having manifested an opposition to the discipline of the church, he was suspended in 1843, and ordered to an ecclesiastical house of correction, but refused to submit to the order. On Oct. 1, 1844, he published a letter against the exhibition of the "holy coat" at Treves, which was soon followed by the organization of the so called German Catholic congregations. (See GERMAN CATHOLICS.) He published in succession a number of pamphlets, in which he called on the Roman Catholic laity and the lower clergy to leave the communion of that church and join the German Catholic movement. These pamphlets were generally understood to be written from the standpoint of deism, although it was not distinctly avowed; in subsequent years Ronge pronounced himself more and more unreservedly in favor of deistic doctrines. In 1847 and the following years he took an active part in the political movements of Germany. In 1848, after the election of the vicar of the empire, he issued with Bayr-

hoffer and Germain Metternich, in the name of the German democracy, a protest against that election. He subsequently emigrated to London, where he signed in 1851, with Ruge, Struve, Kinkel, and others, a democratic manifesto to the German people. He also became in London the leader of a free congregation. In consequence of the amnesty granted by the Prussian government, he in 1861 again made his appearance in Breslau, where he was received by his friends with enthusiasm.

RONSARD, PIERRE DE, a French poet, born at the castle of La Poissonnière, near Vendôme, Sept. 11, 1524, died Dec. 27, 1585. He belonged to a noble family of Hungarian origin, became a page to the duke of Orleans, the son of Francis I., then entered the household of James V. of Scotland, and spent 3 years in Great Britain. Returning to the duke of Orleans, he was sent on several missions, and had a narrow escape with his life from a shipwreck when on a second visit to Scotland in 1540. Deafness befell him in conjunction with ill requited love, and about 1542 he devoted himself to classical studies, which he continued for 7 years, with a view to perfecting the French language. In executing this plan, a young nobleman, Joachim Du Bellay, who had joined him, published in 1550 his *Défense et illustration de la langue Française*, followed in 1551 by the 1st volume of Ronsard's poems. These were severely assailed by the adherents of the old school for his attempts at imitation of the Greek style of composition. Among Ronsard's supporters we find Michel de L'Hospital, who was afterward chancellor of France, and now advocated the cause of the literary reformers in a Latin satire. The performances of the Pleiad (the name by which Ronsard and his 6 friends, Du Bellay, Baif, Jamin, Belleau, Jodelle, and Pontus de Thiard, used to style their own literary association) appeared in rapid succession, and were very popular. The poems of Ronsard were hailed with enthusiasm, and the title of "the French poet" was bestowed on him. He became also a great favorite with Charles IX., who desired his company in all his travels, insisting upon his sleeping under the same roof, if not in the same room, and bestowing upon him pensions and gratuities of all kinds. Diana of Poitiers called him her own poet; De Thou the historian thought his birth to be a full compensation for the disastrous defeat of Pavia; Queen Elizabeth of England sent him a valuable diamond; Mary, queen of Scots, forgot her captivity in reading his poems; and when Tasso visited France in 1571, he paid his homage to this "prince of poets," and solicited his advice. His glory, especially on account of Malherbe's criticism, faded away in the 17th century, but his memory has been recently revived. Many complete editions of his works were published from 1567 to 1630. His choice poems have been collected by Ste. Beuve as an appendix to his *Tableau de la poésie Française au 16<sup>e</sup> siècle* (1 vol. 12mo.).

ROOD, a square measure, equal to the fourth part of an acre, and consisting of 40 square rods, which is equivalent to 1,210 square yards or 10,890 square feet. Its measure as a square would be 104.355 feet on each side, that of the acre being 208.710321 feet.

ROOF, the covering of any building designed to protect its interior from the weather. It ordinarily consists of a framework upon which is secured the external coating; and in carpentry the meaning of the term is restricted to the frame, which in large buildings is the most thorough and perfect work of art combined with science that enters into their construction. In different countries various sorts of roofs, and formed of a great variety of materials, have prevailed, according to the requirements of the climate and the skill of the people. The most ancient roofs of which we have any account were those that covered the simple structures of the Egyptians and Thebans, formed of layers of the large leaves of the palm plastered with mud and this covered with mats. The extreme dryness of the climate admitted of their being flat, and they were used at night as sleeping places. The large fan-like leaves of certain species of palm are still used in warm climates as a thatch for common houses. Straight round poles are set up as rafters (where tropical rains prevail they are placed at a steep pitch), and horizontal strips of wood being secured to these at suitable intervals, the leaves are tied down to them with strong vegetable fibres, each row above overlapping that below, as shingles are laid. Other common vegetable substances, as straw, grass, and the bark of trees, particularly the first, have served in ancient and modern times for the covering of houses, and in the arctic regions blocks of ice and snow answer the same purpose; skins of animals are also used by savage tribes.—The arch of stone work or brick, though apparently known to the ancient Egyptians, was little used by them; but the ancient Greeks appear not to have been acquainted with it, and their more important structures of stone were covered with sloping roofs, often of 15° to 16° inclination from the horizontal, formed of large slabs of marble accurately fitted together so that rain water could not find its way between them. Tiles were early introduced, formed of baked earthenware, both in flat sheets or "plain" tiles, and of semi-cylindrical form with open ends, known as pan tiles. These, still very extensively employed in various parts of the world, require a strong framework to sustain their weight, being naturally heavy and moreover set to great disadvantage in this respect. They are placed in rows up and down the slope, which should be about 24°, every other row having the concavities upward, and receiving the edges of the tiles in the two adjoining rows, which lie with the convex surface upward. Each tile overlaps the next one below it in the same row, and the lap being pointed, no water can get under the tiles as it

flows down the slope. Such roofs are as clumsy as they are heavy, and cannot be walked upon; snow, moreover, is apt to work out the pointing and penetrate the cover, so that they are poorly adapted for cold regions. Roofs of cement or concrete are much used in some of the cities on the Mediterranean, and are well approved, especially where flat roofs are desired as places for enjoying the cool air of the evening. These require a strong framework to support their weight. Slates have long been in extensive use as a material for covering roofs in European countries and in American cities. They are nailed on in horizontal rows, those above overlapping and breaking joints with those below. According to the length of the lap the slope may be from  $26^{\circ}$  to  $30^{\circ}$ . Shingles of pine or cedar are in general use in all small towns and country houses throughout the United States, and form a neat roof, which needs renewal in from 8 to 12 years, and occasional repairs in the mean time. Canvas and coverings of sheathing paper are used upon some buildings, these materials being laid over with a thick coating of ochreous paint, or with coal tar boiled down and intermixed with sand and sprinkled with clean gravel or small pebbles. Sheets of lead, of copper, of tinned iron, and of zinc have of late years been largely employed upon important buildings. Zinc, which in 1840 was hardly known as a covering for roofs, is now very generally used for this purpose in Germany, and in Paris very few roofs of importance have been covered with any other material since 1845. In England it has not been so generally adopted, probably for the reason that the English zinc is of very inferior quality to that made on the continent, and consequently deteriorates rapidly. The purest metal should be used as least liable to be acted on by any acid vapors in the atmosphere, and special care must be taken that it comes nowhere in contact with iron, even with nail heads, as this metal would cause its oxidation by galvanic action. It is hence necessary to employ zinc nails for fastening it down. As with the use of other metallic sheets, particular care is necessary in laying them on to allow sufficient room for their contraction and expansion by changes of temperature. They are adapted for flat roofs, and zinc especially has the advantage of great lightness. Measured by the square of 100 superficial feet, or about 11 square yards, the covering of zinc weighs about 1 cwt.; that of lead from 5 to 7 cwt., according to its thickness; and that of slates from  $5\frac{1}{4}$  to 9 cwt. In the large edifices of iron and glass introduced of late years the roof has been constructed of the same materials with the other portions, and these have proved admirably adapted for these special buildings. For the roofs of conservatories particularly glass is the essential material.—The means of supporting the outer covering of roofs is the consideration of chief importance in their construction. Roofs are like bridges spanning across from one wall to

the other, and in many respects are built on the same principles to secure the necessary strength and stiffness. The space may be spanned by an arch, and this is sometimes practised; but the plan is not so suitable for a roof as for a bridge, on account of the former lacking the fixed abutments which are always obtained for arched bridges. Roofs thus constructed must be provided with supporting walls of unusual solidity. The principles of these structures are described in ARCH, and of the full circular arched covering in DOME. Framework in timber has been, until the recent application of iron to this use, almost the sole method of forming roofs; and the object has been to arrange the timbers in such shapes as to secure the greatest strength and stiffness with the least weight of material, without lateral strain or thrust upon the walls, and so as to present two or more inclined planes for the slopes of the roof over the enclosed space. The simplest figure is that of two inclined planes leaning toward each other and connected along their upper lines over the central line of the space they cover, the lower edge of each resting upon one of two opposite parallel walls. Such a frame consists of rafters standing in pairs. They may be boarded over and then shingled or otherwise covered; and the roof is the common or gable-ended roof. The upper line, called the ridge, extends the whole length of the roof. It may be cut off by an inclined plane sloping toward the end of the building, and this may be done at one or both ends. If the building is square, the ridge then disappears, and the 4 inclined planes of equal dimensions meet in a point over the centre of the square. The lines of meeting of the side and end slopes are called hips, and the roof a hipped roof. In case the rafters are not extended upward till they meet, but terminate along the edges of a nearly horizontal plane, which forms the summit of the roof, this is called a truncated, terraced, or cut-off roof. By this arrangement the convenience is obtained of a level area upon the roof, and excessive height is avoided. The latter is also effected by two slopes upon the same face, the lower one of a steep pitch and the upper one flatter. This is called a curb roof, and is a particularly useful form in cities, as it allows good space for bedrooms under the roof. Curbed and hipped roofs are both more ornamental than the common roof in breaking the monotony of the extensive plane surfaces of the latter; but any considerable surface approaching a level cannot be admitted in roofs of ordinary strength where much snow falls. The irregular forms of buildings introduce corresponding modifications in the roof. The parts of this which cover different portions of the former must meet in such manner that joints may readily be secured impervious to rain and snow. A great diversity is exhibited in the height of roofs in proportion to their span; and in the present availability of various excellent cover-

ing materials adapted for the most gentle slopes, even of  $3^{\circ}$  to  $4^{\circ}$ , this is more a matter of taste than of importance. As regards economy, the determination of the pitch of the roof would depend upon the comparative cost of the covering materials, and the locality in respect to exposure to fire. In cities, it would be a choice between flat roofs with metallic sheets or asphaltum composition, and steep roofs with slates; while in the country shingled roofs might be preferred with slopes in which the rafters may be  $\frac{3}{4}$  or  $\frac{1}{2}$  the length of the span.—When rafters are placed upon two opposite walls in the simple manner described, it is obvious that they tend to thrust the walls outward, and a heavy roof thus sustained would endanger the whole structure. To counteract this tendency, it is necessary to prevent the spreading apart of the feet of the rafters by connecting them together. The simplest method of doing this is by a horizontal beam laid across the span and receiving at each end the foot of one of the rafters securely mortised to it. This is called a tie beam; a chain or slender iron rod would answer the same purpose, the strain being that of longitudinal extension. In roofs of wide span there is a tendency of the tie beam to settle in the middle, and this must then be counteracted. This is ingeniously done by suspending between the upper ends of a pair of the rafters a timber being called a king post, the ends of the rafters being let into its enlarged upper part, which is bevelled to fit them, and is sustained like the key stone of an arch, while the lower end has an iron strap or stirrup bolted to it which passes around and holds up the middle of the tie beam. Thus a frame complete in itself is formed, which will rest upon the walls with all the load that may be placed upon it without pressing upon these otherwise than vertically. This frame may be stiffened by the introduction of braces and ties of various forms; but in every piece introduced it is to be always borne in mind that, excepting those which immediately carry the covering, every one is worse than useless that is not directly drawn upon in the direction of its length as a tie, or compressed in the same line as a brace. The first addition required to the frame, which is now called a truss, is to support the middle portion of the rafters and prevent their settling. The foot of the king post, made large like its upper end, affords a fixed point for the foot of a brace or "strut," one on each side, going to the middle of the rafter on that side. Several such trusses being put together are set on the walls they are designed to cover at equal distances apart, and secured by wooden strips laid on the walls their whole length and called wall plates, and also by horizontal strips fastened to them and called purlins. There may be one of the latter across the middle of the rafters, or two or more on each side of the roof at equal distances apart. For a small roof, the covering of which is to be placed immediately on these rafters, the purlins are attached

on their under side; but in more important roofs the trusses are merely an interior framework, outside of which is arranged another upon which the covering is laid. The rafters already described are in this case called principal rafters or "principals," and the purlins are laid outside of them. The king posts project above the ends of the principals, and receive in their upper ends a flat bar called the ridge piece, set edgewise and extending horizontally along the roof. Outside the lower ends of the principals the tie beams extend far enough to receive a long wooden bar called a pole plate, which is laid down horizontally and secured to these ends. The "common" rafters are now placed upon the pole plates and the purlins, and are attached at their upper extremities to the ridge piece. The whole frame thus constructed is known as a carcase roof. It is variously modified in different structures to adapt it to the different conditions required and to the various dimensions of the buildings. A beam called a collar or truss beam is often placed at some height above the tie beam, and goes across from one principal rafter to the opposite one. It is mortised at each end into an upright tie called a queen post, and the whole is supported by the upper ends of short abutting rafters laid under the principals, which are braced in the middle by struts let into the feet of the queen posts. The king post terminates in the middle of the collar beam, which it holds up, and the tie beam is sustained at two points by the two queen posts instead of in the middle only by the king post. A truss thus formed without the principals and king post would represent one mode of constructing the truncated or terraced roof. Such a roof is more strongly made, but with loss of garret room, by two studs joined together at the foot in the middle of the tie beam, and each one connected at its upper end with the collar or truss beam at its junction with the rafters. In many edifices the horizontal tie beam is objectionable on account of its appearance, or on account of its diminishing the otherwise available height of the area covered by the roof; and numerous devices have been contrived to render it a less prominent object while its useful effect is retained. One simple method is to make it in two lengths and slope them upward to the shortened king post, to which they are strongly secured by an iron strap and bolts. The ends of the rafters mortised into the lower extremities of these beams over the walls tend to thrust them outward, and a powerful strain is exerted upon the strap according to the weight upon the truss to draw the beams apart, and pull them down from the king post. The truss may be stiffened by a diagonal bracing of alternate struts and ties secured together in iron straps at their ends, where they are fastened by the same contrivance to the rafter or tie beam. The lowest brace often starts from the wall some distance below the roof

and crosses the tie beam. Such a brace may act as an abutting rafter to support a collar beam connected with the foot of the king post and the upper extremities of the tie beams. In skilfully distributing these pieces, and giving to them artistic shapes not inappropriate to the purposes they are designed to serve, pleasing effects are produced from what might otherwise appear as clumsy deformities, and the genius of the architect is exhibited. In some elaborate roofs, chiefly of the mediæval period, the tie beam is entirely dispensed with, and the walls are protected from the lateral thrust of the rafters by their great solidity or by projecting buttresses on the outside. In some churches of great height and thin walls the novel feature of flying buttresses was introduced. These are piers of masonry built up on the extended line of the principal rafters entirely separate from the walls, and connected with them by struts or braces of heavy timbers. The church of Notre Dame at Paris presents a remarkable example of these. In such structures the weight of the roof may be sustained quite independently of the walls. Among other methods of reducing the lateral thrust of the rafters without using tie beams, the architects of the middle ages introduced curved oak ribs or braces, which started from the wall plates on each side and were secured around their curves to the rafters and collar beam. These proved very serviceable in stiffening the truss, and as they continued to be used various forms were given to them. Their width or depth was often so great as to render them very conspicuous objects in the architecture, and their feet being carried down the wall in long pendants, they served to distribute the lateral thrust over a larger portion of the surface. Timbers bent in the form of a bow have been of late years applied in various ways to aid in the support of the principal rafters. A very simple method is that of Mr. A. H. Hildsworth, described in vol. xxxviii. of the "Transactions of the Society of Arts" (1820), intended to do away with struts and king posts, in order to obtain the most room in the uppermost story. A tie beam is used under each truss, but fixed in the wall some distance below the roof, and designed to come under the upper floor which it is to support. The lower end of the curved timber is mortised into it where it enters the wall, and the upper end is secured to the opposite rafter near its upper end. Another curved timber is placed the same way on the opposite side, the two crossing each other just under the ridge. The principal rafter bears upon the middle portion of the convex surface, and at the foot is inserted in a horizontal plate laid on the top of the wall, and reaching across it to the curved timber, to which it is fastened by an iron strap to counteract the lateral thrust of the rafters. About the year 1825 Col. Emy of the French *génie militaire* introduced a new form of curved beam of great strength and capable of being extended to any length. It was

built up of several thicknesses of plank, first bent to the proper curvature, and then laid upon each other so as to break joints, and securely fastened by bolts and straps. The roof over the riding house at Libourne was thus built from his designs in 1826. The ribs were made of 5 thicknesses of plank, each one nearly 2 inches thick, 6 inches wide, and 40 feet long. The form of the beam was semicircular, and its action was like that of an arch. Its springing from the walls was 24 feet above the ground, and its span 70 feet. Several ties with straps connect it with the wall, and the principal rafters and purlins rest upon it either directly or through the intervention of struts. Though it was obviously very defective in exerting a strong lateral thrust upon the walls, which was all the greater on account of its elasticity, and heavy buttresses were required to sustain these, the plan still gave great satisfaction, and was soon adopted in other structures, especially in bridges, in which it is to be seen in the United States, and for which it seems still more suitable than for roofs. As used in the great northern railway station at London, the ribs are made of 16 layers of plank each  $1\frac{1}{4}$  inch thick. Col. Emy designed a second roof of this kind of 130 feet span for the cavalry school at Saumur. Each truss is composed of two sets of built-up ribs, kept apart at the foot by trellis work, and joining together as one rib about half way up the curve. Special additions to the walls were made in masonry to sustain the foot of the ribs. The same plan has more recently been adopted by Col. Emy for the most gigantic roof ever projected in wood or iron. This is of 328 feet span, and is intended for another riding school. The design comprises two ribs like those described, with another intermediate one, carried up about  $\frac{2}{3}$  of the span and braced, also an enclosing wall about the building, from which return walls 50 feet long and 4 feet thick extend to the foot of each truss. These are perforated with arches for passage ways for spectators. It is maintained by Col. Ardant, also of the *génie militaire*, that straight beams built together in polygonal form of square timber, and properly framed and bolted so as to oppose their length to the weight, are stronger and otherwise better than the curved ribs, in which the elasticity of the bent planks is the great element of resistance. Roofs are also formed of lattice work after some of the various plans adopted in the construction of wooden bridges.—The requirements of railroad stations for roofs of wide span and of materials neither combustible nor liable to warp have led to the introduction of wrought iron for this purpose, and the construction of trusses of great lightness, strength, and elegance. In other important edifices this material is now generally employed. The principles upon which the bars and rods are put together are the same as those involved in the construction of wooden roofs, but the completed forms appear very differently. The tie beams



are commonly curved gently upward like a low arch, and held by a succession of queen posts at regular distances along the line of the curved or straight rafters, upon which the metallic sheets are directly laid. Diagonal braces crossing each other are generally placed from the foot of one post to the head of the next. The arrangements of the rods vary, however, to a great extent in different structures. Cast iron, as better resisting compression, is to be preferred for the struts to wrought iron, and these are often moulded in highly ornamental forms. Nearly all the roofs of great span now made are of iron, and before the last work of Col. Emy's of this kind, the widest span in the world was that of the New street railway station in Birmingham, England, of 212 feet. The Lime street station in Liverpool has 152 feet span. The only occasion heretofore for roofs of very wide span was for buildings devoted to cavalry exercise, and the widest structure of this kind was at Darmstadt, erected in 1771; it is 228 feet long and 154 feet wide in the clear of the walls. Paul I. of Russia, after examining it, determined that a still larger building of the same kind should be constructed at Moscow, and one was planned 852 feet long and 808 wide; the actual span of the roof, however, according to the plan, would have been only 230 feet. The main support of the roof was a curved rib of three thicknesses of timber notched on to each other. It is said to have been finished and used in 1791; but the statement is denied by others.—The construction of roofs is treated in works on architecture and carpentry. Among those most valuable to consult are Tredgold's "Principles of Carpentry;" Nicholson's "Architectural Dictionary;" "Practical Builder," &c.; Robinson's "Mechanical Philosophy;" Morin's *Leçons de mécanique pratique*; Rondelet's *L'art de bâtir*; Emy's *Traité de la charpenterie*; and Ardan's *Études sur les charpentes à grande portée*.

ROOK (*corvus frugilegus*, Linn.), a well known member of the crow family, of about the size, form, and color of the common crow, from which it differs principally in having the base of the bill covered with a rough scabrous skin, whitish in old birds. It is about 20 inches long and 40 in alar extent, the bill  $2\frac{1}{2}$ ; the female is a little smaller; the color is black, with purple, greenish, and bluish reflections, the feathers of the neck blended, and on the fore part of the head abraded; the head is entirely feathered in the young; albinos sometimes occur, and the bill is often variously distorted. It is found over most of Europe, and abundantly in many parts of Great Britain; it is also said to occur in Japan. Rooks live in society all the year round, building their nests, seeking food, and roosting in flocks; their resorts, called rookeries, are often very extensive, one near Edinburgh in 1847 containing 2,660 nests and about 30,000 inhabitants of all ages. The nests are made on tall trees, often in the midst of populous towns, and the same are used

year after year; they are fond of the groves of old family mansions, where they are protected by the owners, who are proud of an antiquity certified by the rooks. They are very early risers, going in search of worms in the fields or of garbage in the streets; they dig up larvæ from the earth and from among the roots of grass; they sometimes visit the beaches and flats in search of shell fish and crustaceans; they eat also grain, seeds, insects, nuts, lizards, but rarely if ever carrion; they plunder the grain fields only when forced by the hunger of themselves or young; they have been known to devour the eggs and young of birds; they feed with birds of various families without quarrelling. They are not ungraceful on the ground, walking with much dignity; they prefer open fields, placing a sentinel to warn them of danger, and flying off at his alarm note with great noise; the flight is generally by slow and regular flappings, without undulations; they often go many miles in search of food, and, if they return in the forenoon or early afternoon, a storm of rain or snow within 24 hours may be confidently expected. The cry resembles the sound "khraa," monotonous and harsh when heard from a single individual, but not unpleasant from a flock at a distance. They begin to repair their nests early in spring, and lay 4 or 5 eggs, light greenish blue, spotted and clouded with grayish brown and light purplish gray; the young are hatched about the middle of April, and leave the nest by May 20; great numbers of the newly fledged birds are annually shot, being considered by many in England savory constituents of a meat pie; the quills are sometimes used for writing. The rook has been taught to imitate the sounds of animals, but is less intelligent and docile than the raven, crow, and jackdaw. Though it devours grain largely, both in seedtime and harvest, like others of its persecuted family it much more than repays the farmer by the destruction of insects injurious to vegetation; it is especially fond of the larvæ of the cockchafer (*melolontha vulgaris*, Fab.), a species very destructive to the roots of grass and grains.

ROOKE, SIR GEORGE, an English naval officer, born near Canterbury in 1650, died Jan. 24, 1708. He entered the navy as a volunteer, and for services on the coast of Ireland in 1689 was promoted from the rank of post-captain to that of rear admiral of the red by William III.; and in 1692 he was made vice-admiral of the blue. In the battle off Cape La Hogue, May 19, 1692, between the combined English and Dutch fleets and the French fleet, he led a night attack in the boats of the squadron, and burned 6 French three-deckers and 7 other ships of the line, with a loss of only 10 men. He was in consequence made vice-admiral of the red, received a pension of £1,000, and was knighted. He was twice elected to parliament, and upon the accession of Queen Anne in 1702 he was constituted "vice-admiral and lieutenant of the admiralty of England, as also lieu-

tenant of the fleets and seas" of that kingdom. The war of the Spanish succession having commenced, he was sent with a fleet against Cadiz, an attack upon which place was made, but abandoned. Upon his passage home he received intelligence that the Plate fleet, under convoy of a French squadron, had taken shelter in the port of Vigo, and he planned an attack in concert with the duke of Ormond. The town was stormed and 17 ships destroyed; the specie and goods taken amounted in value to \$5,000,000. In July, 1704, he made the attack on Gibraltar in conjunction with Sir Cloudesley Shovel and the prince of Hesse. Several batteries were carried in succession by the British sailors, and the Spanish garrison finally surrendered upon the terms offered by the English. Rooke fell in on Aug. 9, 1704, with a French fleet of 52 ships and 24 galleys under the count of Toulouse, and succeeded in forcing an action off Malaga. The battle began in the morning and lasted till night, when the French got away, after losing 3,000 men; the English loss was 2,000. He passed the remainder of his life in retirement.

ROOTS, PHILIP PETER. See ROSA DI TIVOLI.

ROOT, in botany, that organ which usually penetrates the earth, to imbibe from it nourishment suitable to the growth of the plant. In its development it divides itself into branches which are called rootlets or fibres, and which terminate in smaller and hair-like ends of a spongy tissue. No true root ever produces buds or leaves, even if exposed to the air and light; if they apparently do so, they are to be regarded as subterraneous stems. The potato tuber is a familiar example of a swollen subterraneous stem, though usually called a root; and some cacti, orchids, &c., have long, tough, aerial roots. Sometimes these are adventitious, as in the rootlets which issue from the lower joints of the Indian corn and from the joints of the grape vine. Roots are either annual, biennial, or perennial, according as they perish in one or two years, or survive for several years; but even these conditions depend in a degree on climatic circumstances, some that are normally perennial changing to annual, as in the garden nasturtium (*tropæolum majus*), in which case a single season is sufficient to produce flowers and seeds; and others naturally annual being made biennial or perennial, by preventing the flowers from expanding and the fructification from taking place. Roots are also liable to change in form and size, especially under cultivation, as in the cultivated carrot, whose normal root thickens and becomes fusiform; or in the turnip, where it swells laterally and becomes broad and flat; or in the dahlia, where the fibres increase to tubers. There is also little proportion of the roots to the rest of the plant, and even this diminishes, until the root entirely disappears in whole genera of the lower orders.—The office of the root is not only to find nourishment, but to excrete various substances. It possesses

also the extraordinary power of penetrating bodies harder than the earth. The general tendency of the root to seek an opposite direction to the stem is admitted, but the reason cannot be assigned. Roots are frequently the stores of nutriment for the use of the next year's vegetation; they also contain gums, resins, acids, and other properties found important in medicine and the arts.

ROOT, in mathematics, such a quantity as, multiplied into itself a certain number of times, produces a given quantity. Thus, 2 is a root of 4, of 8, of 16, &c. In its lowest degree it is expressed by the symbol  $\sqrt{\quad}$ , written before the given quantity; thus,  $\sqrt{9}$  is that number which, multiplied into itself once, produces 9, viz., 3; it is read "the square root of 9." The higher degrees are expressed by placing an appropriate number above the symbol; thus,  $\sqrt[3]{8}$  is read "the cube root of 8," and is that number which, multiplied into itself twice, produces 8, viz., 2;  $\sqrt[4]{a}$  is read "the 4th root of  $a$  raised to the 4th power," and is the quantity which, multiplied into itself 3 times, produces  $a^4$ , viz.,  $a$ ; and so on.—The term is also employed in algebraic equations to represent the value or values of the unknown quantity or quantities, which value or values, substituted in the equation, will make the two members of it identical. To discover this value or these values is the object proposed in the solution of the equation.

ROPE, a large cord at least an inch in circumference, formed by twisting together a collection of vegetable fibres, thongs of hides, hair of animals, or iron wires. The smaller sized cords thus made are termed twines and lines, and all are included under the general name of cordage. Ropes of some sort have always been articles of prime necessity even to the rudest people. The inner bark of some trees roughly twisted together furnished materials for them, as also vines, and the slender leaf stems of the rattan palm, the flexible branches of trees like the willow or the stronger hickory, and the tough pliant shrub, *dirca palustris*, a product of wet lands, and known as the rope bark or leather wood. The ancient Peruvians, for their suspension bridges, twisted together the strong fibres of the maguey, and formed of them huge cables as large as a man's body. Thongs of hides have also been found convenient materials for ropes. The South American and Mexican hunter thus makes his lasso, and the native miners, when they substitute the operation of hoisting for the painful task of carrying up to the surface the products of the mines, resort to the same material. The earliest preserved records of rope making are of the processes of the ancient Egyptians, pictured in their tombs. From these it appears that they made use of flax, twisting the fibres together for twines and the smaller ropes, while for those of larger sizes they employed the fibres of the date tree, which are still used for the same purpose. They also made long strings

of leather, cutting them around large disks by the method still practised and known as the "circular cut;" and putting 4 of the strings together, they secured the end in a strong tube, to which were attached at right angles a lever and ball, by which it could be thrown round by the hand. A ring or swivel at the other end of the tube furnished the means of securing it to the body of a workman without obstructing its turning. Being then taken in one hand, the man walked backward, twisting the rope with the other, while another workman seated opposite to him let out the strings as required, at the same time keeping the rope tight.—In modern times the materials mostly employed for ropes are hemp, the Manila plantain leaf, and a few other vegetable fibres, and flax for lines. The properties of many of these are referred to in the articles COIR, FLAX, HEMP, JUTE, &c.; more complete descriptions are contained in papers published in the "American Journal of Science," vols. xxi. and xxv. (1832 and 1834). Rope making was regarded as an object of much importance to the early colonists in this country by those in England who promoted the first settlements, and efforts were made to introduce it with other branches of manufacture in Virginia, where the climate and soil were found to be well adapted for the culture of hemp and flax. The colonists, however, devoted themselves almost exclusively to the more favorite pursuit of raising tobacco, and manufactures were greatly neglected. In New England, where manufactures and ship building early engaged the attention of the people, the culture of hemp was regarded with more interest. The seeds of the plant were received in Salem in 1629, and in 1641 the general court of Massachusetts directed attention to the wild hemp (probably the *apocynum cannabinum*), describing it as "growing all over the country," and as used by the natives for making clothing, nets, mats, and lines. In the same year a town meeting was held at Salem to take measures for encouraging the hemp culture with reference to the several useful applications of the article. The manufacture of cordage was begun in that year in Boston by John Harrison, and in 1662 John Heyman of Charlestown was authorized to make ropes and lines. In Connecticut action was had upon the same subject by the government at Hartford in 1642, and directions were issued that hemp seed should be sown "for the better furnishing the river with cordage toward the rigging of ships." In the "History of Pennsylvania and West New Jersey," by Gabriel Thomas (London, 1698), mention is made of the large and curious ropewalks in Philadelphia, several of which were owned by Mr. Joseph Wilcox.—In the manufacture of ropes the same general principles are involved whatever fibre is used, and the general description of the process of making hemp ropes may apply to that of the other sorts also. The fibres of hemp not averaging more than  $3\frac{1}{2}$  feet in

length, they are necessarily overlapped among themselves and compressed together so as not to be drawn apart. The required compression is best obtained by twisting, the fibres being continuously drawn out together from a bundle in the right quantity to produce the suitable size of yarn. The yarns are put together to make strands, and 3 or 4 of these twisted together make a rope, and 3 or 4 ropes a cable. These successive steps cause the strain to be more equally diffused among the fibres than it would be if these were laid together in sufficient quantity at once and twisted; and moreover the alternating directions given to the twist in the several operations cause the different portions to bind upon themselves and form a permanently firm bundle. The fibres only once twisted make but a loose bundle, which, though decidedly stronger than the same quantity made into a hard-twisted rope, is not so durable nor so well adapted for the ordinary purposes of ropes. The actual loss, as found by trial, is about  $\frac{1}{4}$  of the full strength of the fibres; and with a view of saving this, as well as the loss in length, which is also  $\frac{1}{4}$ , ropes have been made of yarns laid together and wrapped. These proved unserviceable for most uses on account of the wrapping soon wearing off and moisture getting among the fibres and rotting them. Rope making is conducted in narrow buildings, called ropewalks, several hundred feet long and from one to 3 stories in height. The first process to which the hemp is subjected is hackling, the object of which is to draw out the fibres in straight lines and remove the short lengths and dust. The hackle is a sort of comb made of an assemblage of long, sharp steel points set upright upon a firm bench. For some purposes several of different degrees of fineness are used, commencing with the coarsest. A bundle of hemp held near one end is laid over the points and drawn through, and the operation is repeated, reversing the ends. The short lengths, called tow, are collected and hackled again by themselves to be used for inferior sorts of ropes. The hemp is now prepared for spinning into yarns. In the common process of spinning by hand, a large wheel at the end of the walk is kept turning by a boy and carries round a number of hooks or whirls set in a frame above it, all facing up the line of the walk. The spinner, having wrapped around his body a bundle of hemp, the middle portion of the fibres in front and the ends behind, draws from it in front a portion sufficient for making a yarn, and twisting this in his fingers he attaches the end to one of the whirls, and walks backward. As he proceeds the fibres are continually drawn out from the bundle, the quantity being regulated by the action of his hands, one of them pulling forward or holding back the fibres and the other compressing the yarn as it passes through a thick woollen cloth held around it. He thus endeavors to keep the thread of uniform thickness throughout.

As many spinners may thus be engaged at the same time as there are whirls to the wheel at the end of the walk. To keep the yarn out of the way, hooks are provided on the under side of the cross beams, and as one is passed the spinner jerks the yarn up to make it catch his proper hook. Thus it is held suspended when he has reached the end of the walk. There two spinners fasten their ends together and put them over a stout post on one side, also tying them together with a piece of twine a little in advance of the post. The two next do the same, and thus the ends come to be all collected around this post. The spinners then commence each a new yarn at the wheel where they ended the first one, and return down the walk as they came up. The one who turned the first wheel detaches the ends from his whirls, and securing them to a post in the same way that they were attached at the other extremity of the walk, he runs forward throwing the yarns out of the hooks on the beams to a row of large hooks in the posts of the building at a convenient height above the ground and on the same side with the two end posts. The same process is repeated at each turn of the spinners until 300 or 400 yarns come to be collected in the side hooks, when they are called a haul and are ready for the next process, which is tarring the yarns, unless they are to be spun into strands for untarred ropes, known as white ropes. Sometimes yarns are wound off upon reels as they are spun, and thus kept until the number is sufficient for warping, which is the stretching them out on the side hooks and giving to them a slight twist. The length of the yarns in a full-length walk is not less than 200 fathoms or 1,200 feet.—Such is the old process, still in common use in a small way, for obtaining the threads or yarns of which ropes are spun; and until 1820 all the cordage made in the United States was the product of hand labor alone, except that in laying up the strands into rope horse power was employed at one end of the walk to twist these. In that year machines were introduced from England for working the yarns already spun by hand into strands and ropes; and this was the only innovation upon the hand processes until 1834, when machines for spinning the threads were invented by Mr. Treadwell in Massachusetts. From that time these have undergone various improvements, and are now so far perfected that the rope manufacture has assumed an entirely new character and importance. The operations are now concentrated in a few large establishments, and are conducted more like cotton spinning, with powerful machines attended chiefly by females. The character of American cordage has improved so that it is exported to almost all parts of the world, including the British provinces, East Indies, and even London and Liverpool. The American machines themselves were introduced into Canada several years ago, and in 1860 into Great Britain and Ireland, where the demand

for them is rapidly increasing. By the new processes the bales of hemp are first taken to the upper story of the factory, where they are opened, and a quantity is taken out and oiled and carefully laid in layers, making a heap called a batch. The first operation is to scutch this, which is now done by a machine consisting of a cylinder of about 5 feet diameter and 20 inches width of face, enclosed in a wooden cover. Across the face of the cylinder are fixed rows of sheet iron plates standing edgewise, those in the same row  $1\frac{1}{4}$  inches apart, and set opposite the spaces in the next adjoining rows. The front end of the sheets is curved and is 6 inches high, the back end running down to a point. On the back of the machine is a hole through the cover for admitting the hemp, and on the opposite end is another by which the tow is thrown out. As the cylinder rapidly revolves, a workman, holding a bundle of the hemp tightly in his hand, lays it upon the edges of the plates, which run through it and carry off the tow. He then changes ends and repeats this, when the hemp is hatchelled and ready for the lapper. The scutcher was invented by Mr. Salisbury of West Troy, N. Y., and another answering the same purpose, in which stout curved hackle pins were substituted for the sheets, was introduced by Mr. Wall of Bushwick, Long island. The lapper consists of a large cylinder of 6 or 8 feet diameter and  $2\frac{1}{4}$  feet width of face, armed with stout, sharp-pointed steel pins  $4\frac{1}{2}$  inches long set in 70 or 80 rows across the face of the cylinder, and slanting forward. There are also a pair of feed rollers and a cylinder of  $2\frac{1}{2}$  feet diameter formed of two circular cast iron slotted plates, keyed about 2 feet apart upon an iron shaft. In each of the slots is a strong hackle bar, on which there are about 34 gills; and these, by means of cam plates fixed on the inside of the framing of the machine, are moved so that the hackles enter the hemp as it comes over the feed rollers, and leave it as it is taken by the pins of the large cylinder. A weighed portion of hemp is introduced and run up on the cylinder, when the machine is stopped, and a workman opening the front of the cover places an iron bar under the roll of hemp, and reaching the end draws it off from the cylinder, causing this to rotate backward. The hemp is thus obtained in a long bundle, the fibres all extended alike. This is next taken to the drawing frame, a strongly made machine with an iron frame about 6 feet long, 2 feet wide, and 4 feet high, sustaining 3 fluted heavy iron rollers, which mash into each other and are heavily pressed together with levers and spiral springs. There is beside a pair of smaller delivering rollers geared from the others and also pressed with levers and springs. An endless chain of hackle bars occupies most of the length of the machine, and carries the hemp forward to the rolls, the fibres being pulled through the bars with a draft made to vary with the character of the

work in hand. The hemp is thus drawn out into a sliver, which is run into a large tin case or wooden box; and a number of slivers according to the weight of yarn to be made are put over a second drawing frame, differing from the first only in the fineness of the hackles. The sliver passes from it through a wooden conductor to the room below, where are the jennies or spinning frames. These machines, which have effected the revolution in rope making, were adopted some years ago in the cordage factories on Long island, in a much less perfect form than they now have. A mechanic came on from Boston to put them up in the works of Messrs. Tucker and Cooper of Brooklyn, when the rope makers of Long island, foreseeing the effect they must have on their trade, threw the mechanic into a tar kettle, and rode him on a rail to the ferry, threatening to kill him if he returned. The machine was greatly improved about 18 years ago by a mechanic named Montgomery employed in the works of the late Mr. Thursby at Williamsburg, Long island; and to his improvements the very perfect machines of Messrs. Todd and Rafferty of Paterson, N. J., chiefly owe their superiority, which is recognized by their general adoption in the principal works in the United States, and recently in Europe. The object to be attained in the jenny is the rapid spinning of the sliver into a yarn, and at the same time feeding it faster or slower according to the size of the sliver, so as to produce an even yarn, and then winding this upon bobbins. Each frame, for convenience of tending, is double, each portion being a duplicate of the other and run by its own driving belt. They are from  $8\frac{1}{2}$  to 9 feet long, between  $2\frac{1}{2}$  and 3 feet wide, and about the same height. They are arranged in rows along the room, a single room sometimes containing 100 frames. A female attendant looks after  $2\frac{1}{2}$  frames or 5 bobbins, keeping the supply of sliver full, seeing that it is regularly fed, and replacing the bobbins as they get full. The sliver, collected in cans, is brought to each frame, and a portion being laid on the endless chain of small gill bars which carries it along, the end is passed between a pair of calender rollers, one of which is grooved and one tongued, and thence through a flyer by which it is twisted, and the yarn wound upon the bobbin inside of it. The flyer is formed of two circular ends connected by two arms, and upon one of the ends is keyed a small pulley, which is driven by a drum beneath. The bobbin inside of the flyer runs loosely upon a long spindle, and is moved back and forth on this by means of a rack and pinion which connect it with the flyer. The pin rack is attached to a tube which runs loosely on the spindle and passes through the end of the flyer. On the end of this tube which is inside the flyer is fixed a small plate with a little catch riveted to it, which serves to hold back the bobbin that it may take up the yarn. The arrangement

for regulating the size of the yarn is connected with the calender rollers, through which the sliver passes, and acts upon the chain of gill bars to make this feed faster or slower, causing a less or greater strain upon the fibres of the sliver. Under the calender rollers and near the floor runs a small shaft with two triple eccentrics keyed upon it. These are turned with small grooves on their circumference, in which run loosely straps with long fingers attached to them. The fingers push ratchet wheels on another shaft a little in front, and this shaft by a small belt carries the chain of gill bars. As the sliver passes between the rollers, any thick portion raises the upper one and the levers which press on it. One of the levers, connected with a lifter beneath the eccentric straps, raises these, and thus causes the ratchet wheels to move slowly or stop altogether, and the same effect is extended to the chain. Where the sliver is too thin, the lifter drops and the eccentric fingers fall into a smaller ratchet wheel, and by this speeds up the chain, and again brings the yarn to the desired size. The spinning is effected with great rapidity, the flyer revolving at the rate of about 1,400 turns in a minute. One girl tending 5 bobbins spins about 1,100 lbs. of yarn every day, or 925 lbs. of fine yarn, or 750 to 800 lbs. of very fine yarn; she is paid 10 cents per 100 lbs., or for the very fine 11 cents. This is the result of actual operations, taken from the factory books, running for a number of days; but it is probably with the use of hemp of the very best quality, which not only works with greatest ease but also weighs most. The manufacturers of the machines count one scutcher, one lapper, two drawing frames, and 5 jennies as a set, and estimate that this will, with the labor of 3 men and 6 girls or boys, produce 1,250 lbs. of No. 20 yarn in 10 hours as a fair average.—The subsequent operations, by which the yarns are converted into rope, have long been in general use in the United States and Europe. For making tarred rope, the first process is to tar the yarns. A large number of reels as they come from the jennies are set in a frame so as to be easily unwound, and the ends are passed each through its own hole in a guide plate over one end of a large trough of copper or iron called the tar kettle, which contains tar kept by a fire beneath at the temperature of boiling water. The yarns are all made to pass through guides placed near the bottom of the trough, one at each end, thence up the further end and through holes in another plate by which the excess of tar taken up is scraped off. The yarns may then either be collected together in sufficient number for a strand in a register tube, where they undergo a partial pressure and twisting, or they are wound up again each on its own reel to be afterward used as convenient. Whenever the yarns are brought together to be twisted into a strand, the proper number for 3 separate strands are attached to as many spindles, which are affixed to a ma-

chine that can be drawn the whole length of the ropewalk, the rope by which it is drawn causing the machinery it carries to be kept in motion and a strong tension to be kept upon the strands. The yarns are let out as required from the end of the walk at which the spinning commenced. The machine having traversed the length of the walk, the 8 strands are left behind stretched along upon the stake heads and pins set in the posts of the building, upon which they have been thrown by the man attending it. The machines for twisting the strands and for laying these into rope are of various forms, and all are too complicated to be described without drawings. They are specially designed to give the required twist and maintain a heavy strain upon the rope. As this is completed it is wound upon reels, from which it is slipped off in the form of coils, which being securely tied together are ready for the market. The cordage manufactured for the British navy is marked by a colored worsted thread introduced in the centre of each strand; and every combination of strands or rope is distinguished by a peculiar yarn in its centre. Ropes are designated as to size by their circumference, and as to length by fathoms. Their weight and strength vary with the quality of the hemp and method of manufacture. The following table, prepared by Mr. Andrew Smith, a famous English maker of wire ropes, is usually referred to as authority on these points. A later and more complete table is also given at the close of this article:

Hemp rope.			Wire rope.			Equal to a strain of
Size, inches.	Weight per fathom, lbs.	oz.	Size, inches.	Weight per fathom, lbs.	oz.	
3	3	4	1½	1	4	2 10
4	8	15	1½	1	9	8 10
5	6	0	1½	1	14	6 15
6	9	0	2	2	2	8 0
7	12	3	2½	2	9	8 11
8	14	3	2½	4	1	9 13
9	19	6	3	5	4	15 6
10	25	0	3½	7	1	24 6
11	30	0	4	11	6	29 5
12	36	8	4½	15	13	33 4

For mining and some other purposes ropes are sometimes made flat by laying several small ropes side by side and securing them together by sewing or other method. To insure their lying flat it is essential that the ropes should be alternately of right and of left hand twists. By Huddart's patented process the ropes thus laid together pass horizontally through a steam-heated box, in which they are softened by the effect of the heat upon the tar. They then pass through a sort of box just adapted to their size fixed in a table and open at the ends. In the sides are holes through which steel piercers like large straight awls are forced by machinery penetrating entirely through the several ropes—one piercer alternately from each side. Needles are immediately introduced by the operators, one standing on each side, and the thread, which is itself sometimes a rope half an inch thick, is drawn through and tightened. Extreme elasticity has been imparted to ropes

by introducing threads of caoutchouc with the hemp; the particular use of such ropes is for the anchors or grapnels of balloons, and their effect is to materially lessen the jerk when these catch and hold the balloon fast.—The rope manufacture of the United States is now almost exclusively conducted by a few large houses in Massachusetts, New York, and Philadelphia. Those in Massachusetts are J. Nickerson and co., and Sewall, Day, and co., of Boston; the Plymouth cordage company of Plymouth; and the New Bedford cordage company of New Bedford. In New York, the factories of Lawrence, Waterbury, and co., and William Wall's sons, at Williamsburg, are the most extensive in the country. At Brooklyn is the factory of Tucker, Cooper, and co., and at Elizabethport, N. J., in New York bay, are the works of the Elizabethport cordage company. In Philadelphia, the two factories of Weaver, Fitler, and co. produce from 2,000 to 3,000 tons of rope per annum; and those of Sproat, McIntyre, and co. consume about 50 bales of jute hemp a week in the manufacture of lines and small ropes of ¼ to 1 inch circumference. There are numerous other small establishments, which altogether do not make ¼ of the total product of the country. Cotton rope is manufactured at a number of factories in the southern states, and also on a considerable scale at Norwich, Conn. The material is but a poor substitute for hemp, lacking its strength and durability. It retains moisture when once wet, and is liable to soon rot.—Wire ropes were originally made about the year 1831 for use at the mines in the Hartz mountains; and public attention in England was first directed to their excellent qualities for this application in 1838. Their superiority to hempen ropes was said to consist in their much greater lightness for the same strength, and greater durability when subjected to the peculiar causes of destruction common to mines, as running through muddy waters, frequent rubbing upon rough surfaces, and the constant wear upon pulleys. The manufacture was soon undertaken in England, and was very successfully prosecuted, especially under the patents of Mr. Andrew Smith. The use of the ropes too was extended to the standing rigging of ships, to the drawing of trains upon railways by stationary engines, and to various other purposes. At many of the mines they were successfully introduced, excepting in Cornwall, where as late as the year 1851 the use of one was first permitted at the Tresavean mine, and the novel material was regarded with great distrust. In their less weight, bulk, and cost, and greater durability, they were found to possess very decided advantages for the standing rigging of ships over ropes of hemp, and they were soon adopted for this purpose upon many of the ships of the royal navy and also in the mercantile marine service, till in 1857 it is stated that three fourths of all the ships rigged at Liverpool were provided with standing rigging of this character.

The application of the material to suspension bridges and to electric cables gave greatly increased importance to wire rope, and the manufacture became very extensive under the several patented processes. By that of Mr. Andrew Smith the wires are supplied from bobbins, which are mounted in frames set between the peripheries of two, large six-armed horizontal rings, one set several feet above the other, and together forming a sort of cylindrical cage. Upon the bottom of the central axis is fixed a spur wheel by which the cage is made to revolve, and the lower end of the vertical axis of each bobbin frame is connected with the central axis by a spur wheel gearing, revolving with it. The bobbin frames thus revolve on their own axes while they are carried at the same time round the central axis. The wires pass up over the cage, and at some height above being collected in a strand, this is at the same time twisted, and is carried over a pulley above the top of the machine, and thence down to the reels upon which it is wound. In the United States wire ropes were first employed for the inclined planes upon the earlier railroads, and upon those of the Morris and Essex canal in New Jersey. They were also adopted in some of the collieries in Pennsylvania and for the suspension bridges in different parts of the country. Improvements were introduced in the manufacture by Mr. John A. Roebling, at his works at Trenton, N. J. He constructed at Niagara the great cables for the suspension bridge below the falls, each of which is 10 inches in diameter, containing 7 strands, each strand having 520 wires of No. 9 wire gauge. The aggregate strength of the whole 4 cables is about 23,878,400 lbs. For this manufacture the very best iron is selected, and the bars are drawn down at a welding heat to wire of about  $\frac{1}{4}$  inch diameter. This is then cleaned in warm water acidulated with a little oil of vitriol, and being coated with a paste of rye flour, it is drawn through a succession of holes in a wire plate until it is reduced to the thickness of No. 5, when it is annealed by heating from 5 to 8 hours, and is then cleaned and drawn down again until it is of the required degree of fineness. In general the ropes are made of strands, each of which has 3, 7, or 19 wires, the ropes having either 9, 49, or 133 wires. The important considerations in laying them up are to keep an equal tension in all the wires, and to prevent their being twisted as they are laid into strands, and that the strands also should be equally free from twist as they are laid into ropes. Wire ropes are easily secured at the ends by a metallic socket variously fastened to it; and in similar methods, hook cleavices, turn-buckles, or other similar appendages are attached to the ends, and serve for facilitating the tightening of the ropes when they are employed for standing rigging and other purposes requiring occasional shortening or lengthening. Wire ropes are spliced without difficulty. Steel wire has

also been applied to the manufacture of ropes. The following table of the relative strength of the several kinds of rope is furnished in a late English publication:

Hemp.		Iron.		Steel.		Equivalent strength.	
Circumference, inches.	Lbs. weight per fathom.	Circumference, inches.	Lbs. weight per fathom.	Circumference, inches.	Lbs. weight per fathom.	Working load, cwt.	Breaking strain, tons.
2 $\frac{1}{2}$	2	1	1	..	..	6	2
		1 $\frac{1}{2}$	1 $\frac{1}{2}$	1	1	9	3
3 $\frac{1}{2}$	4	1 $\frac{1}{2}$	2	..	..	12	4
		1 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	15	5
4 $\frac{1}{2}$	5	1 $\frac{1}{2}$	3	..	..	18	6
		2	3 $\frac{1}{2}$	1 $\frac{1}{2}$	2	21	7
5 $\frac{1}{2}$	7	2 $\frac{1}{2}$	4	1 $\frac{1}{2}$	2 $\frac{1}{2}$	24	8
		2 $\frac{1}{2}$	4 $\frac{1}{2}$	..	..	27	9
6	9	2 $\frac{1}{2}$	5	1 $\frac{1}{2}$	3	30	10
		2 $\frac{1}{2}$	5 $\frac{1}{2}$	..	..	33	11
6 $\frac{1}{2}$	10	2 $\frac{1}{2}$	6	2	3 $\frac{1}{2}$	36	12
		2 $\frac{1}{2}$	6 $\frac{1}{2}$	2 $\frac{1}{2}$	4	39	13
7	12	2 $\frac{1}{2}$	7	2 $\frac{1}{2}$	4 $\frac{1}{2}$	42	14
		3	7 $\frac{1}{2}$	..	..	45	15
7 $\frac{1}{2}$	14	3 $\frac{1}{2}$	8	2 $\frac{1}{2}$	5	48	16
		3 $\frac{1}{2}$	8 $\frac{1}{2}$	..	..	51	17
8	16	3 $\frac{1}{2}$	9	2 $\frac{1}{2}$	5 $\frac{1}{2}$	54	18
		3 $\frac{1}{2}$	10	2 $\frac{1}{2}$	6	60	20
8 $\frac{1}{2}$	18	3 $\frac{1}{2}$	11	2 $\frac{1}{2}$	6 $\frac{1}{2}$	66	22
		3 $\frac{1}{2}$	12	..	..	72	24
9 $\frac{1}{2}$	22	3 $\frac{1}{2}$	13	3 $\frac{1}{2}$	8	78	26
10	26	4	14	..	..	84	28
		4 $\frac{1}{2}$	15	3 $\frac{1}{2}$	9	90	30
11	30	4 $\frac{1}{2}$	16	..	..	96	32
		4 $\frac{1}{2}$	18	3 $\frac{1}{2}$	10	103	36
12	34	4 $\frac{1}{2}$	20	3 $\frac{1}{2}$	12	120	40

RORIC FIGURES (Fr. *figures roriques*, from Lat. *ros*, dew), a name applied to certain curious images rendered manifest upon breathing on polished solid surfaces, when these have been previously exposed to contact or close proximity of the objects thus represented, and usually at the same time acted upon by light, heat, or electricity. The singularity of these phenomena is, that they consist usually in the production at the first of a sort of latent or invisible image, but which may afterward be developed or brought out, somewhat in the manner of photography. Dr. J. W. Draper, in the "Philosophical Magazine" for Sept. 1840, mentioned certain facts going to show that an insensible molecular change may be made to take place in the surface of bodies; and among them he named the following instance, as long known: "That if a piece of very cold clear glass, or, what is better, a cold polished metallic reflector, has a little object, such as a piece of metal, laid on it, and the surface be breathed over once, the object being then carefully removed, as often as you breathe on it again, a spectral image of it [the object] may be seen; and this phenomenon may be exhibited for many days after the first trial is made." Möser, of Königsberg, however, first distinctly called attention to these figures; his statement through M. Regnault to the French academy in July, 1842, being to the effect that generally, when two bodies are sufficiently near, they impress their images upon each other; or, as he elsewhere states, if a surface has been touched in any parts by any body, it acquires the property of precipitating all vapors, these adhering to or combining with it on those spots, differently



from what they do on others. Möser inferred from the facts that there is a latent light, as well as latent heat; and that bodies radiate such a light, even in complete darkness. Write with a dry, blunt wooden point, a coil of paper, a brush, or any solid that does not scratch or color, on a clean surface of glass, or on any polished solid; no visible trace may appear; but breathe on the surface, and the parts that were touched will alone condense the breath, or they will condense it much more completely than, or differently from, other parts, and the characters traced become visible in lines of moisture. Or, breathe upon a surface, trace upon, and then dry it; breathing upon it again, the figures will reappear. To these appearances the name of Möser's images has been given; while some German writers term them *Hauchfiguren*, breath-figures; and Mr. Grove has designated them as "molecular impressions," a name truly expressing the nature of a limited proportion only of the cases. Place a coin on a clean looking-glass, and leave both for some time in the sun; removing, and breathing gently on the glass, a quite distinct image of the coin will appear. Mr. R. Hunt produces similar effects by heat; and he ascribes the phenomena directly to thermic agency, though he seems to claim also (what more recent investigators deny the necessity of) a galvanic influence, his results being best when the metals used were electrical opposites, and as the impressing object was larger. He placed on a well polished copper plate, too hot to be handled, coins and medals of gold, silver, bronze, and copper, and allowed the whole to cool; removing the objects, exposing the plate to the vapor of mercury, and wiping off any non-adherent mercury, he found that the coins had made impressions on the surface that were distinct in the order above given, those of the gold and silver most so; and these were permanent. Whatever in cases of this kind the change may be, the parts of any device affect the surface to which they are near, according to the relative proximity of the projecting and depressed portions. By exposure over night, he obtained a very distinct image of the grain of wood placed at more than half an inch distance from the receiving plate; and so, images are readily obtained with objects  $\frac{1}{4}$  inch from the surface; a very good plan is, with the object on or hung near the plate, to place both on the mantelpiece over a fire, the ascending heat radiations being thrown back from the object, and affecting the polished body. See the chapter on "Thermography" in R. Hunt's "Photography" (republished in New York, 1852). Karsten placed a medal on a glass plate, resting on one of metal (a coin on a looking-glass coated with amalgam may be used), and allowed a few sparks from an electrical machine to fall on the medal; removing, the image is brought out by vapor of mercury, iodine, or the breath. Some years previous, Riess had discharged electric sparks on glass and mica

plates, and breathing on these, brought out figures of the traces of the spark. But if he first cleaned the glass by boiling in nitric acid and washing in ammonia, or employed platinum foil clean enough to fire gases, or fresh mica surfaces obtained by splitting for the occasion, no figures appeared after applying the electric spark. Karsten concludes that surfaces show figures after the electric discharges only when they have previously become "weathered" over with minute depositions of fatty and other organic matters; the spark burning these off along certain lines, which then behave differently from the other parts to moisture and to light. This doubtless explains some of the figures due to electricity, as does the supposition of Fizeau some of those occasioned by heat. The latter considers that most surfaces are slightly coated with fatty or organic matters, and that during proximity these are transferred in minute quantity to the receiving surfaces. It is known that mercurial vapor condenses in a manner visibly different on a surface already soiled or exposed to vapor, however slightly. But there are instances that appear to be covered by neither of these suppositions, and which can only be explained by some actual change in the molecular constitution of bodies, affecting their subsequent behavior toward the physical forces. If we modify Karsten's experiment, by placing 8 or 10 plates beneath the coin, and afterward mercurialize the upper surfaces of all the plates, the figures appear upon them all, but more faintly as the surfaces were further removed. Electrical discharges render evident impressions long apparently obliterated by polishing, thus showing that these could not have been superficial merely. The surfaces may be impressed in the dark, and without known change of temperature. Near a polished silver plate fix one of glass, painted black, with characters scratched through this coating, and expose to the sun for some days; or place a lattice-work before polished granite in the sun for half an hour; the images can in either case be afterward developed. The electric images are not easily obliterated by ordinary means of washing and rubbing. Mr. Hunt, observing that black substances in case of heat leave the strongest impressions, applied this fact, in an art which he named thermography, to the copying of prints, cuts, writing, &c., the impression obtained on amalgamated copper being treated with mercury to develop the light, and with iodine for the dark spaces. The art in this form has not been practically introduced. Breguet, the celebrated Parisian watchmaker, found inscriptions on the inner case of a watch reproduced on the inner surface of the outer case; and engineers observe examples in which the near surfaces of parts of machines become visibly impressed the one on the other. Without doubt these are instances of mere transfer of material; and a sort of printing, due to such transfer during long

contact, is obviously the explanation of such cases as those of the images which picture framers find impressed on glass or paper with which a print has been long in contiguity. Photographic negatives or positives sometimes produce latent impressions on paper, or through it on sensitive surfaces with which they are laid away; and a sensitized plate from which one picture had been apparently discharged, receiving a second, has had the two pictures then developed on the same field. These and similar phenomena must be explained on simply chemical principles. Mr. C. A. Seely, of New York, announced to the photographic society of that city, at its meeting on June 13, 1859, the remarkable facts, that a sheet of sensitive paper, having been enclosed between several folds of a printed circular, and left within a book, of course in the dark, for about a week, impressions became visible on both sides of the sheet, and the printing on both sides of two or more folds of the circular became superposed on the sensitive paper, that of more distant folds being sometimes the more distinct, and usually not on their own, but on the opposite side of the sensitive sheet. Some of these facts have not yet been explained. Mr. Grove, at the fishing ground of M. Seguin, observed peculiar spots on some trout, and placing freshly caught fish with a serrated leaf on each side in the sun, found that, after a while, that on the sunned side had impressed its image on the skin of the fish, while that in the dark had not. Grove experimented also by placing paper with letters cut in it between glass plates, making these with sheets of tin foil into a Leyden apparatus, and electrifying for a few seconds with a Ruhmkorff coil; then, breathing on the inner surfaces of the glass, images of the letters appeared; or by exposure to hydrofluoric acid, these were permanently etched. Pouring over a plate holding this latent image a film of iodized collodion, and treating as for a photograph, exposing to diffused daylight, another image, also insensible, was by the consequent action on light induced in the collodion film; and this being dried, removed, and submitted to developing agents, the insensible molecular change by which characters were impressed on the glass by electricity was finally rendered manifest by visibility of the image in the film. A recent statement has appeared, to the effect that the breath figures could not be developed during warm, humid weather, in June, 1859; and that, on an impressed surface, the breath of different persons deposits differently, or of the same person at different times, depending on the time elapsing since a meal, the kind of food, and the state of the health. The same writer states that if a spark from a small, well charged Leyden jar be, by the knob and a discharger, directed to the sides of a carefully cleaned plate of glass about 4 inches square, and nearer to one side, the spark will ramify in fine lines on the glass, but mainly collect itself into one trunk, sometimes dividing into 2

or 3 running in a course on either side to the edge. These evanescent figures, or their traces, the breath develops, that on the positive side being stronger. It is inferred that the fine ramifications are feelers, so to speak, put forth in advance of the actual discharge, and finding for it the line of least resistance. The electrical traces are believed to present a near resemblance to the actual path and behavior of the discharge of what is called chain lightning through the air; and the advance lines of the charge are supposed to explain that sensation, as of cobwebs over the face, felt just before, or even without, a lightning stroke, and frequently by persons on shipboard. Not the least singular among the cases of molecular impression, if true, are those of the visible images occasionally reported as being formed during a flash of lightning, and by a sort of electrical photography, in the epidermis of the human body or of leaves of trees. Franklin, in 1786, mentioned a case as having occurred 20 years before, in which the exact representation of a tree opposite was found on the breast of a man struck by lightning. M. Poey, of Havana, has collected many statements of this kind, in which the image of a tree, or of some part of one, of a horse shoe at masthead, of a flower, &c., was impressed on certain parts of the body; and one in Cuba, in 1852, of an image of certain pine trees being formed on some leaves of poplar,  $\frac{1}{3}$  of a mile distant. It is certain that the electric light abounds in the chemical rays; and it is possible that some substance in the epidermis renders it a sensitive body; and further, that these rays, focalized on the instant by some spherule of water, falling or fixed, and in proper position, may be directed on the surface with an intensity enabling them to act unimpeded through the really porous garments, just as a sharp flash is faintly visible by penetration through the closed eyelids. Admitting this, however, no developing agent for the picture appears; and the explanation, like the circumstance, may be mentioned as curious, rather than as ascertained. The number and variety of the ways known in which the luminous, actinic, and thermal rays, as well as electric perturbation and discharge, are capable of modifying the condition, and doubtless the molecular constitution of bodies, have been since the time of the announcements by Draper and Möser continually on the increase; until we are at length led to admit that many or all of these agents must modify molecularly all bodies subjected to their influence, and in turn their subsequent behavior to many of the physical forces. (See FLUORESCENCE, PHOSPHORESCENCE, and PHOTOGRAPHY.) Finally, it appears no longer necessary, with Möser, to ascribe these actions to latent light; nor with Herschel, to claim a peculiar heat or set of "parathermic rays;" but simply to regard them as all reducible, when properly understood, to effects of certain well known physical agencies.

RORQUAL, the largest of the whale family, distinguished from the Greenland or right whale (*Balaena mysticetus*, Linn.) by the presence of a dorsal fin, and by nearly parallel longitudinal folds extending between the arches of the lower jaw, from the under lip along the chest and abdomen. The name rorqual is derived from a Norwegian name which means "whale with folds;" the genus was named *balanoptera* by Lacépède in 1804; the whalemen give to it the names of razorback and finback. There are no teeth, and the baleen or whalebone is very short. The largest species is the great northern rorqual (*B. boops*, Flem.), probably the most bulky and powerful of living animals. The head is about  $\frac{1}{4}$  the length of the body, which is longer, more slender, and less cylindrical than in the right whale; the blubber is much thinner, rarely exceeding 6 inches, on which account, and also because the baleen is of comparatively little value, the whalemen rarely attack this bold, restless, and powerful inhabitant of the ocean. The head is so flat that the longest baleen plates seldom measure 4 feet; there are many hundred plates, becoming toward the sides mere bristles; the posterior arch of the palate is large enough to admit a man, though the opening of the œsophagus would not allow any thing larger than a cod to pass; the sieve is coarser and the swallow larger than in the right whale, indicating a totally different kind of food, the rorqual devouring not only medusæ and crustaceans, but immense numbers of herring, pilchards, salmon, haddock, and cod; Desmoulins states that 600 good-sized cod, and a great quantity of pilchards, have been found in the stomach of a single individual. The longitudinal folds of the under surface vary in width from  $\frac{1}{4}$  inch to 3 inches, and allow of the distention necessary to hold the water containing its prey, which is strained through the baleen during the shutting of the mouth; the tongue is free at the apex. The rorqual attains a length of 100 to 110 feet; the body is compressed on the sides, and angular on the back; the head comparatively small, and the tail narrower than in the right whale; the lower jaw is longer and much wider than the upper; there is a small dorsal opposite the vent; the pectorals are distant from the angle of the mouth, slender, straight, and pointed; the blubber rarely yields as much as 8 or 10 barrels of oil. The color is dark bluish gray, lighter below, the lower lip and the folds rosy white. They blow so violently as to be heard a great distance in calm weather; when seen, they are almost always in motion, rarely lie quietly blowing like other whales, and when about to descend do not throw the tail high in the air. They are abundant in the arctic seas, especially on the coast about Spitzbergen, between lat. 70° and 76° N., and even as far as 80° in open summer weather; they generally avoid much ice, and are shunned by the right whale, and their appearance is consequently unfavorable to the

whalemen's success. The usual rate of swimming is about 12 miles an hour; they are bold, but not revengeful or mischievous, though like other whales they will often attack and destroy a boat when their mates or young are wounded. The Greenlanders sometimes take small specimens by following in their canoes, and throwing so many lances that the animal dies from loss of blood; they are also occasionally stranded in their pursuit of herring and other fish into shallow water on a retreating tide. In a skeleton 78 feet long, the head was 21, and the vertebral column 57 feet; there were 7 cervicals and 13 dorsals, the longest rib (the 6th) 11 feet long; the bodies of the larger vertebræ were 14 inches in diameter, and 6 to 7 feet from tip to tip of the transverse processes; the skull in some parts had a vertical thickness of more than 3 feet. In a female 95 feet long, the head was 22 and the lower jaw 25 feet long, and the weight of the skeleton 35 tons. This, with the Mediterranean rorqual (mentioned below) and other species, Gray places in a distinct genus *physalus*, though without very satisfactory generic characters. The lesser rorqual, considered by Bell as the young of the greater, was made into a separate species by Dr. Knox with the specific name of *minor*, and is the *B. rostrata* (Gray). It attains a length of 25 feet, and has 15 fewer vertebræ than the preceding species; the baleen is short and white, the folds of the throat rosy, and the upper part of the base of the pectorals is marked with a white spot. It frequents the rocky bays of Greenland and the coasts of Norway and Iceland, sometimes descending to lower latitudes; it feeds on the arctic salmon and other fish; it is very active and rarely attacked, though its flesh is highly esteemed in northern climates; the oil is also very delicate, and forms an important article of the Icelandic materia medica.—The rorqual of the southern seas (*B. australis*, Cuv.) has a long dorsal immediately over the pectorals; it is black above, white beneath, and the folds roseous; the vertebræ are 52 in all. It rarely approaches the cape coasts, and from its strength, velocity, and small yield of oil, is not considered worth pursuing; it attains a length of 40 feet; its activity is such that it can leap entirely out of water; it is fond of floating perpendicularly, with only the head above the surface. This is the black whale of the South Pacific, which the fishermen are generally anxious to avoid; it is busy in the most violent storms, when the waves throw medusæ and flying fish and other surface species into its capacious mouth. The rorqual of the Mediterranean (*B. antiquorum*, Fisch.) was known to the ancients, and was probably the one called *mysticetus* by Aristotle, and *musculus* by Pliny. Some of this species have been stranded on the southern coasts of France, 60 to 80 feet in length; the color is grayish black above, the lower jaw and the folds rosy, and the rest of the lower parts white. Other species are described, but it is

unnecessary to enumerate them. The greatest confusion reigns even among naturalists in regard to the rorquals, and it will require an examination of many more specimens to determine if some of the species above mentioned are not local varieties.—Some small species of rorqual have been found fossil in the pliocene of Piedmont, far removed from and high above the present level of the sea. M. Cortesi discovered two species, named by Desmoulins *B. Cuvieri* and *B. Cortesii*, respectively 21 and 12 feet long.

ROSA, FRANCISCO MARTINEZ DE LA, a Spanish statesman and author, born in Granada in 1789, was educated at the university of that city, in 1808 fought against the French, and soon after went to England. On his return in 1811 he was elected to the cortes, of which body he continued a member after the restoration of Ferdinand VII. in 1814. On account of the liberal tendency evinced in his *Revolucion actual de España*, published soon afterward, he was imprisoned for 5 years in the Spanish fortress of Peñon de Velez, on the Barbary coast. He regained his liberty after the revolution of 1820, and in 1822 was made secretary for foreign affairs; but he fled from the country when it was invaded in the interest of Ferdinand VII. by the duke d'Angoulême in 1823, and, after visiting Holland, Germany, and Italy, settled in Paris, where he published several works. In 1831 he was permitted to return, in 1833 became secretary of the Spanish academy, and in 1834-'5 was again secretary for foreign affairs. He was afterward ambassador at Rome, and in 1850 resumed his place in the cortes, as president of the first chamber. Since July 14, 1858, he has been president of the council of state, having been for some time previous its vice-president. He has written several tragedies, two of which were first performed at Paris; a poem on the "Art of Poetry," with valuable prose criticisms on Spanish literature; a history of the French revolution entitled *Espiritu del siglo* (5 vols., 1835 et seq.); *Isabel de Solis* (2 vols., 1837-'9), a romance, and other works.

ROSA, SALVATOR, an Italian painter, born in Arenella, near Naples, June 20, 1615, died in Rome, March 15, 1673. At the age of 18 he made an artistic tour through several provinces of southern Italy, penetrating into the wildest and most savage regions, and associating with banditti, of whom he made many studies for future use. His father died soon after, leaving his family dependent upon Salvator, who contributed to their support by executing drawings on primed paper which he sold to the cheap dealers of Naples. Lanfranco, who was then decorating the church of Gesu Nuovo for the Jesuits, having purchased one of these and expressed his admiration of the talent which it displayed, Salvator's works rapidly rose in value, and he soon after greatly improved his style by the advice and instruction of Spagnoletto and his pupil Aniello Falcone. About the

age of 20, he visited Rome, and soon rose to eminence, not as a painter merely, but as a poet, musician, and actor, assuming on several occasions the chief part in plays written by himself, and for which he also furnished the music. During the outbreak at Naples under Masaniello he returned home and joined the insurgents, but subsequently succeeded in escaping to Florence, where he was employed to paint in the Pitti palace. Thence he went after a few years to Rome, in which city he passed the remainder of his life. Among the most celebrated of his historical works are the "Catiline Conspiracy," "Saul and the Witch of Endor," "Attilus Regulus," now in the collection of the earl of Darnley, and some altarpieces in Rome. He is however much better known as a landscape painter, having been one of the first in Italy to practise that branch of his profession with success or originality. He delighted in gloomy effects, powerful contrasts of light and shade, and romantic forms. He was an excellent portrait painter, and he also left about 90 etchings executed in his characteristic style. Dr. Burney, who purchased several of his musical manuscripts in Rome in 1770, including 8 entire cantatas, written, set, and transcribed by Salvator, had a high estimation of his genius as a composer; and Lady Morgan in her biography of him (London, 1829) describes graphically his talents as an improvisator and a comic actor.

ROSA DI TIVOLI (PHILIP PETER ROOS), a Flemish artist, born in Frankfort in 1655, died in Rome in 1705. The greater part of his life was passed in Tivoli, Italy, and he devoted his talents chiefly to painting animals from nature. His subjects commonly represent scenes from pastoral life, which are executed in all parts with skill and fidelity. His works are distributed over all parts of Europe. He was a man of dissipated habits and coarse tastes.

ROSAMOND, commonly called "Fair Rosamond," the daughter of Walter, Lord Clifford, a favorite of King Henry II. of England, died in 1177. According to the popular tradition, she was first brought to the king's notice through the collusion of her brothers, who desired to advance their own fortunes by means of their sister's beauty. She lived at Woodstock, where Henry frequently visited her. But she was finally discovered by the jealous Queen Eleanor, who "dealt so harshly with her that she lived not long thereafter." She bore to the king William Longsword, earl of Salisbury. She was buried in the church of Goodstone, of which she had been a benefactor, opposite the high altar, where her body remained until 1191, when Hugh, bishop of Lincoln, caused her bones to be removed thence with every mark of disgrace.

ROSARY (Lat. *rosarium*), a bunch or string of beads, in common use among Roman Catholics for counting their prayers. Instances of the use of beads for this purpose can be traced to an early period of the Christian church, but the proper rosary in its present form was introduced by St. Dominic, the

founder of the Dominicans, in the first half of the 13th century. It consists of 15 times 10 small beads, every 10 small ones being preceded by one larger one. At each large bead the Lord's prayer is recited, and at each of the smaller ones the "Hail Mary," the 10th "Hail Mary" being followed by the doxology: "Glory be to the Father, and to the Son, and to the Holy Ghost," &c. In each "Hail Mary," after the word "Jesus," which concludes the first half of it, a few words commemorative of a mystery in the life of Christ are inserted, and it is the contents of this mystery which the devout reciter of the rosary is exhorted by his church principally to contemplate. The rosary was intended to be for the laity what the breviary is for the priests; and as the number of "Hail Marys" in the rosary is equal to the number of psalms which form so prominent a part in the breviary, it is often called *Psalterium Marianum*. The name *rosarium* is probably derived from the appellation *rosa mystica*, by which the Virgin Mary, to whose glorification the rosary is devoted, is frequently designated in the common prayers of the church. Others have derived the name from the rosewood of which the beads were originally made. On account of the length of the original rosary, it soon became and still is customary to take for common use only one third of it, which is also called "the small rosary."—In the 14th and 15th centuries many rosary confraternities were formed, the members of which, by telling the beads in concert, hoped to avert from the church the many calamities then threatening her, especially from the advance of the Turks. Pope Gregory XIII. founded in 1573 a "festival of the rosary," in commemoration of the victory won over the Turks at Lepanto on Oct. 7, 1571, which was to be celebrated on the first Sunday of October, wherever a church or an altar of the Virgin Mary was found. After the victory over the Turks at Peterwardein, Aug. 5, 1716, Pope Clement XI. ordered the festival to be annually celebrated throughout the whole church. In modern times a new kind of rosary fraternities has been founded, called "the living rosary;" it consists of 15 persons, each of whom binds himself to tell daily one decade of the beads.—The Buddhists and Mohammedans likewise use a string of beads for counting their prayers. The string of the Mohammedans has 99 beads, which they drop while pronouncing the 99 names of God occurring in the Koran. Their beads are commonly formed of sacred clay of Mecca or Medina.

ROSAS, JUAN MANUEL DE. See ARGENTINE CONFEDERATION, vol. ii. p. 71.

ROSCELINUS. See NOMINALISM.

ROSCIUS, QUINTUS, a Roman comic actor, born in Solonium, near Lanuvium, at what date is unknown, died about 62 B.C. He enjoyed the friendship of many noble Romans, one of whom was Sylla, who gave him a gold ring, the symbol of equestrian rank. He is fre-

quently spoken of by Cicero in terms of the highest praise and affection, and Macrobius tells us that each would often try to discover which could express a thought the more eloquently, the one by his gestures, the other by his words. Roscius wrote a treatise in which he compared eloquence and acting. His profits were immense, as according to Macrobius he received 1,000 denarii (\$150) every day, and Pliny says that he yearly gained 500,000 sesterces. There is extant an oration of Cicero, handed down in an imperfect state, in which he defends Roscius from a claim of 50,000 sesterces made upon him by C. Fannius Chærea.

ROSCOE, WILLIAM, an English historian, born near Liverpool, March 8, 1753, died June 27, 1831. He was the son of an innkeeper who kept a public house called the Bowling Green, and when 15 years old apprenticed himself to a bookseller. In 1769 he entered a law office, and in 1774 was admitted an attorney of the court of king's bench. When 20 years old he printed an "Ode on the Foundation of a Society for the Encouragement of the Art of Painting and Design," and wrote a descriptive ode entitled "Mount Pleasant," first published in 1777. He began the practice of his profession in Liverpool, took an active part in the agitation for the abolition of the African slave trade, and wrote a poem in blank verse called "The Wrongs of Africa," and also "A General View of the African Slave Trade, demonstrating its Injustice and Impolicy, with Hints toward a Bill for its Abolition" (1787); "A Scriptural Refutation of a Pamphlet lately published by the Rev. Raymond Harris, entitled 'Scriptural Researches on the Licitness of the Slave Trade,' in four Letters from the Author to a Clergyman" (1788); and "An Inquiry into the Causes of the Insurrection of the Negroes in the Island of St. Domingo" (1792). He was also an early advocate of the French revolution, and published in 1796 "Strictures on Mr. Burke's Two Letters addressed to a Member of the Present Parliament." In 1796 he published "The Life of Lorenzo de' Medici, called the Magnificent" (2 vols. 4to), which rapidly passed through several editions both in England and America, and was translated into French, German, and Italian. He brought out in 1805 "The History of the Life and Pontificate of Leo X.," which, like the previous history, was severely attacked by continental critics for the flattering terms in which Lorenzo and Leo X. were spoken of. In a supplementary volume, published in 1822, entitled "Illustrations, Historical and Critical, of the Life of Lorenzo de' Medici," he replied to these various criticisms. In 1806 Roscoe was elected a member of parliament from Liverpool, in the whig interest. After the dissolution of that parliament in 1807, he published several tracts in regard to the war then going on between England and France, which were afterward collected into a volume under the title of "Occasional Tracts relative

to the War." In 1816 a banking house with which he was connected failed, and in consequence he was obliged to sell the library, pictures, prints, and drawings, which for nearly 50 years he had been accumulating. He published several other works of minor importance, and edited Pope's works (10 vols. 8vo., 1824). This led him into a controversy with Bowles in regard to the merits of Pope as a poet.—Three of his sons have become well known in the literary world. HENRY (born in 1799, died in March, 1836) published a life of his father (2 vols. 8vo., 1833), and also wrote "Lives of Eminent Lawyers" for "Lardner's Cyclopædia," beside various legal works. ROBERT (born in 1790, died in Dec. 1850) wrote poems, and completed, for a legacy, his friend Mr. Fitchett's posthumous epic "Alfred" (6 vols., London, 1844). THOMAS has written numerous poems, tales, and other works, and has made excellent English translations of Sismondi's "Historical View of the South of Europe," and of Lanzi's "History of Painting."

ROSCOMMON, an unorganized co. of N. Mich., drained by the south branch of the Au Sable and some of the head waters of the Muskegon and Titabawasee rivers; area, 625 sq. m.; pop. in 1860 not returned. It contains several lakes, the largest of which are Higgins's and Houghton's.

ROSCOMMON, a central county of Ireland, province of Connaught, bounded N. W. by Sligo, N. E. by Leitrim, E. by Longford, Westmeath, and King's county, S. W. by Galway, and W. by Mayo; area, 950 sq. m.; pop. in 1851, 174,492. The principal towns are Roscommon, the capital, Boyle, and Elphin. The Curlew and Braulieve mountains, which attain the height of from 1,000 to 1,200 feet, lie in the N. of the county. The Shannon and its tributary the Suck flow on about  $\frac{2}{3}$  of the whole boundary line, the former expanding in 3 places and forming the loughs of Allen, Boderg, and Ree. The Shannon has been made navigable by means of short canals, and the Suck can be ascended by flat-bottomed boats about 10 m. above its junction with the former. Grazing and agriculture are the chief occupations of the inhabitants. Coarse woollen goods are made for domestic use; and there are some manufactories of tobacco pipes and earthenware. Roscommon contains many remains of antiquity. The county returns two members to parliament.

ROSCOMMON, WENTWORTH DILLON, earl of, an English poet, born in Ireland about 1634, died Jan. 17, 1684. He was the nephew of the earl of Strafford, and after his impeachment went to the continent. After the restoration he held various employments about the court. He formed the design of establishing a society for the purpose of fixing and refining the standard of the English language, and in this had the aid of Dryden. He is reputed to be the only popular poet of the reign of Charles II. whose writings are not immoral.

ROSE (Greek *ῥόδον*, Lat. *rosa*), the common name of a genus of icosandrous exogens, all bushy and prickly shrubs with imparipinnate leaves, serrated leaflets, and stipules adnate to the petiole; the flowers regular, with an urn-shaped calyx tube, which is contracted at the mouth and lined within by a hollow thin disk, into the edge of which are inserted 5 obovate or obcordate petals and many stamens with numerous pistils over its inner surface; the calyx tube at length, becoming thickened and pulpy, encloses the hairy ovaries, which are converted into bony achenia; the seeds solitary and destitute of albumen. The rose is the type of the natural order *rosacea*, which comprises not only shrubs but herbaceous plants with simple or compound alternate leaves, often with 2 stipules at base, occasionally dotted; flowers variously arranged; calyx 4 to 5 lobed, with a disk lining the tube and surrounding the orifice; petals 5, perigynous; stamens arising from the calyx, in estivation curving inward; ovaries superior; fruit either 1-seeded nuts, or *acini* or follicles containing several seeds; embryo straight, with the cotyledons flat. They are natives chiefly of the temperate or cold climates of the northern hemisphere, embracing many small but useful fruits, as the strawberry, raspberry, some beautiful flowers, as *geum* and *potentilla*, and other elegant and graceful shrubs, as the spiræas.—The number of original species in the genus *rosa* is a matter of great uncertainty; and notwithstanding the labors of many scientific men, the genus still remains a chaos. Lindley's *Rosarum Monographia* (London, 1819) and Redoute's *Les roses* (Paris, 1817-'24) may be considered the chief guides on the subject. The number of species adopted by Don in his "General History of the Dichlamydeous Plants" (London, 1832) is 204, arranged in the main after the mode of Dr. Lindley, and giving full catalogues of the principal garden varieties then known. To a natural section of such roses as have their branches thickly beset with prickles, and hence called *feroces*, belongs the fierce rose (*R. ferox*, Lindley), a singular shrub with large foliage falling early in the autumn, large red flowers, and globose scarlet fruit. It grows 3 to 4 feet high with strong and abundant stems, and is deserving a place in collections, the blossoms being abundant and showy. The *bracteata* comprise such as have their flowers furnished with small leaves called bracts, and their fruit clothed with a permanent woolliness, represented in Macartney's rose (*R. bracteata*) and the small-leaved rose (*R. microphylla*), with small double flowers of a delicate blush color. It is a native of China, and is the *hoi-tong-hong* of the Chinese. The *cinnamomea* are setigerous or unarmed bracteate plants, with long, lanceolate, glandless leaflets, upright shoots, and of a compact habit; red flowers, and small, round, red fruit. Several species attributed to North America are arranged here, but the most typical is the cinnamon rose (*R. cinnamomea*, Linn.), a native

of Europe, with pale or bright red flowers, the variety with double blossoms being most commonly seen. The *pimpinellifolia* have leaves with a greater number of leaflets, which vary from 7 to 13 or even to 15, instead of from 5 to 7, thus resembling the leaves of the burnet saxifrage. To these belongs the Scotch rose (*R. spinosissima*, Linn.), a native of Europe, and abundant in Great Britain; it is a dwarf compact bush, with creeping roots, small, solitary, white or blush-colored blossoms, and round black or dark purple fruits. The garden varieties of this species, both with single and double flowers, are very numerous, bearing white, red, purple, and even yellow blossoms. The *centifolia* or hundred-leaved roses comprise the portion which has particularly interested the lovers of flowers, and probably the earliest of those cultivated, among which mention may be made of the damask rose (*R. Damascena*, Miller), a native of Syria, with large white or red, single or double flowers, the shrub growing from 2 to 8 feet high, and flowering in June and July; and the cabbage rose (*R. centifolia*, Linn.), also called the Provence and hundred-leaved rose, a native of the eastern Caucasus, with large white or red single flowers, but under cultivation very double, the petals incurving like the heart of a cabbage, whence its trivial name. Several hundred garden varieties of these fine species are known, among which special notice should be given to the moss roses (*R. c.* var.  $\beta$  *muscosa*, Lindl.) and the pomponne roses (*R. c.* var.  $\gamma$  *Pomponia*, Lindl.), represented in the small and beautiful de Meaux. The French rose (*R. Gallica*, Linn.) has stiff, elliptic leaflets, erect flowers, ovate sepals, red or crimson petals, and nearly globose fruit; it is a native of central Europe, growing in the hedges. From this has sprung a very numerous variety of garden roses, ranging from red to crimson and dark crimson, to the deepest purple and velvet petalled, semi-double and double, and of various shapes; of these latter is the Burgundy rose, with small, solitary, double, purple flowers, resembling the Asiatic garden ranunculus. The familiar white rose (*R. alba*, Linn.) belongs to the section of *villosa*, distinguished principally by its erect and stout root shoots or suckers. It is a native of Europe and Cochin China, and has originated many choice garden varieties, such as the semi-double and the double white, the maiden's blush, &c. A group with the leaves clothed with rust-colored glands beneath constitute the section *rubiginosa*, of which the sweetbrier or eglantine is a familiar instance; there are a dozen natural forms of this species found in various parts of Europe, and numerous garden varieties, both single and double. The dog rose (*R. canina*, Linn.) represents a natural section in which many species agree in a common resemblance to its type. This species is a stout shrub 6 to 10 feet high, with large, pale red flowers, seldom white, and ovate, bright scarlet fruit of a peculiar and grateful flavor;

there are several forms of it occurring throughout Europe and N. Africa. The China rose (*R. Indica*, Linn.) belongs to this section, with an upright, whitish or green or purple stem, stout, falcate, distant prickles, ovate-acuminate, coriaceous, shining, glabrous serrulate leaves, flowers solitary or in panicles, stamens bent inward, and calyx smooth or wrinkled and bristly. Its flowers are red and usually semi-double; it grows to a considerable height, and blossoms throughout the year. There are numerous varieties, of which the Noisette is particularly prominent, having a firm stem and prickly branches, and very numerous, semi-double, pale red, panicked flowers, which are profusely produced during the entire summer. Of the sweet-scented rose (*R. I.* var. *odoratissima*), with rose-colored, sweet-scented flowers, of the odor of tea, and sometimes called the blush tea rose, there are numerous sub-varieties, with white, blush, red, yellow, and copper-colored flowers, all highly esteemed. The ever-flowering or Bengal rose (*R. semperflorens*, Curtis) is a shrub 8 to 10 feet high, flowering throughout the year, with solitary, single or semi-double crimson blossoms; there are some very splendid varieties. A group of species in which the styles are connected and cohere together into an elongated column in the centre of the flower marks the natural section *systyla*; to this belongs the field rose (*R. arvensis*, Hudson), a shrub sending out many cord-like, arched, trailing shoots, the flowers solitary or in globose heads, white, slightly scented; fruit of a dark blood color; a native of middle Europe, climbing over hedges and bushes, but in open situations a trailing plant rooting at its tips. A prominent variety is the Ayrshire rose, with fragrant white flowers in clusters, and esteemed as a garden climber. The lovely *multiflora* rose, with large clusters of rosy colored but small double flowers, is likewise of this section. The Lady Banks rose (*R. Banksia*, Brown) is a delicate-growing climbing shrub, without prickles and smooth; flowers in umbel-like corymba, numerous, very double, nodding, sweet-scented; fruit globose, black; it is the type of the section *Banksianea*, all the species of which are remarkable for their long, graceful, often climbing shoots, ternate shining leaves, and drooping white flowers. The white and yellow Banks rose are elegant plants for the greenhouse; they were introduced into gardens from China.—The species of North American roses are probably not numerous; at least those of the United States can be reduced to a few typical forms, and several admitted into European works are on doubtful authority. The climbing rose (*R. setigera*, Mx.) has corymbed, systylous flowers, with glandular calyx, pointed sepals, deep rose-colored petals, which change to white, and globular fruit; its stems are climbing, armed with stout, nearly straight prickles, the leaves with 3 to 5 ovate, acute, sharply serrate leaflets, smooth or downy beneath. It is



a fine species, sending up shoots 10 to 20 feet high in a season; from it have originated numerous beautiful double-flowered varieties known in gardens as prairie roses, of which the queen of the prairies and the Baltimore belle are instances. The swamp rose (*R. Carolina*, Linn.) has a tall stem 4 to 8 feet high, armed with stout hooked prickles; leaves with narrow stipules, and 5 to 9 elliptical, often acute leaflets, dull above and pale beneath; numerous flowers in corymbs; petals rose-colored, styles separate; fruit depressed-globular, somewhat bristly. It occurs in swamps and woods, sometimes forming thickets, and is a common and widely extended species. The dwarf wild rose (*R. lucida*, Ehrhart) has stems 1 to 2 feet high, armed with unequal bristly prickles, the stouter and persistent ones nearly straight and slender; the leaves shining above, with 5 to 9 elliptical or oblong-lanceolate, sharply serrate leaflets; broad stipules; peduncles with 1 to 3 flowers, and appendaged, glandular, bristly calyx lobes, the petals rose-colored; the fruit depressed-globular, and smooth when ripe. It is a common species in dry soils or on the borders of swamps, flowering in May and June; a smooth and narrow-leaved form is the *R. nitida* of Willdenow. The early wild rose (*R. blanda*, Aiton) is chiefly a northern species, found on rocks and banks from Vermont to Pennsylvania and Wisconsin. It grows 1 to 3 feet high, with nearly smooth stems; oval, oblong, obtuse serrate leaves of 5 to 7 leaflets, pale on both sides; large stipules; flowers rose-colored, 1 to 3, the peduncles and calyx tube smooth and glaucous; globose fruit, crowned with the persistent calyx lobes. The true sweetbrier (*R. rubiginosa*, Linn.) occurs on roadsides and in pastures; it is generally a low bush, but sometimes climbing high, with stout, strong shoots, armed with numerous prickles both hooked and straight; leaflets doubly serrate, rounded at base, covered with fragrant rusty glands beneath. It is an elegant species, but adventitious from Europe, and seen mostly near the seacoast. The smaller flowered sweetbrier (*R. micrantha*, Smith) is similar, also introduced from Europe, and occasionally met with in Massachusetts. The Cherokee rose (*R. laevigata*, Mx.) has a long, trailing, smooth stem, the branches armed with stout curved prickles; the leaves evergreen, mostly trifoliate, leaflets smooth and shining, lanceolate, stipules deciduous; flowers large, solitary, white; calyx very bristly. Elliott says that for forming hedges there is perhaps no plant which unites so many advantages, on account of quickness of growth, facility of culture, strength, durability, and beauty. The origin of the species is obscure, but it has been known in the southern states for a long time.—The rose is readily raised from its seeds, which are little hard nuts enclosed in the swollen calyces called hips; these should be gathered when perfectly ripe and packed down in sand until the following spring, when the pulpy parts will

be found decayed and may be rubbed from the seed, so that they can be sown in March or April in a soft soil and covered about an inch deep. Sometimes they do not vegetate until the second year, and the rows should be preserved for two years, though the greater number may have vegetated freely and the plants attained a height of a foot or more. When strong enough, the young plants are to be transplanted into rows 2 feet apart at least, and allowed sufficient space where they can remain until they flower, which will be about the 4th summer. When choice varieties are desired, impregnation can be resorted to; or the hips from good sorts, which have been planted in masses with other and better kinds, should be selected. After having secured some choice sort by seed, it is to be increased by layers, using the young shoots of the preceding summer early in the spring, and by the next autumn strong-rooted plants will be obtained; the moss rose and a few others require a longer period to form roots. Many excellent sorts freely throw up suckers, which, carefully removed, can be used for forming new plants. The Chinese and soft-wooded greenhouse species are raised principally from cuttings, using the tender shoots and striking in sand with a gentle bottom heat; and ripened wood will form roots under a bell glass if allowed more time. Those which are found difficult to increase by these means can be propagated by budding, inserting well formed eyes or leaf buds in some free and strong growing stem; and in this way what are called standard rose trees, a modern invention, are prepared. Some of these, with stems 15 feet high, are furnished with heads composed of several species or varieties of roses, and when planted out in the border or in the conservatory are extremely attractive. Generally 2 buds or eyes are inserted on opposite sides of the stocks, and often 6 to 12 in alternate positions on the upper part of the stems. Such plants require protection in winter in the northern states, but in a favorable climate they are of great value in the garden. All sorts of roses have been found to succeed best in airy and open situations, away from towns and cities. In their native habits, roses grow in a sandy and barren soil, while the swamp roses are found in a cold and almost wholly vegetable soil. Double roses, being artificial productions, require a garden soil of good loam, moist, and inclining to clay. Some particular sorts are very shy of blooming under any care; and though no shrub bears severe pruning generally better than the rose bush, yet there are some few kinds which will only blossom upon unpruned plants.—The rose has from the earliest times been a universal favorite; and with the ancients it seems to have been extravagantly esteemed. Among the Romans roses were more highly prized than any other flowers, and they had even discovered how to force them into winter blooming. Among the eastern nations the rose is likewise a choice

flower, is extensively cultivated, and its charms are extolled in poetry and song. In the middle ages chaplets of roses were worn on festive occasions, and from the 13th to the 16th century constant references are made to roses as tributes, presents, and garden decorations. The several kinds now in existence are well adapted to modern floriculture, some however forcing better than others. The multitude of new varieties to be seen in our greenhouses and conservatories, and in commercial market establishments, show how much has been effected in this direction in a few years past. As a useful plant the rose has been treated as an object of special cultivation in almost every country. In Syria, the earliest date of its condition in this respect is unknown, and the aboriginal name of that country signifies the land of roses.—The attar or essence of roses forms an article of commerce on the coasts of Barbary, in Syria, Persia, and India. Rose water is distilled from the petals of pale roses in preference to deep red ones. Vinegar of roses is made by infusing dried rose petals in the best distilled vinegar, and it is used for headache produced by the heat of the sun or by vapors from burning charcoal. Spirits of roses is procured by distilling rose petals in sand heat with a small quantity of spirits of wine. Conserve of roses is prepared by bruising rose petals in a mortar with their weight of sugar; and in the earlier times this was considered a specific against a cold. Honey of roses is made by beating fresh rose leaves with a small portion of boiling water, and, after filtering the mass, boiling the pure liquor with honey; it was formerly used for sore throats and ulcers in the mouth. Oil of roses, employed by hair dressers, is prepared by mixing bruised and fresh rose leaves with 4 times their weight of olive oil, and leaving them in a sand heat for 2 days. In domestic economy the hips of some species are used as fruit for making preserves; the green leaves of the sweetbrier, steeped in spirits of wine, are used to impart flavors, and are dried to form a substitute for tea; the tender and succulent shoots, stripped of their bark and leaves, are candied.—Several species of rose can be usefully employed in making live hedges. Several kinds of insects prey upon the rose. In the United States the thrips, rose bug, aphid, and the red spider are its pests; but strong solutions of soap, mixed with soft water of the temperature of 100° F., syringed over the bushes twice a week, will check their depredations.

ROSE, HEINRICH, a German chemist, born in Berlin in 1795. His grandfather, Valentin Rose the elder, and his father, Valentin Rose the younger, had both been distinguished chemists. He first devoted himself to pharmacy, studied in Berlin, in Stockholm in 1819 under Berzelius, and from there went to Kiel, where he took his degree. In 1823 he became extraordinary and in 1835 ordinary professor of chemistry at Berlin. As a practical analyst in the de-

partment of inorganic chemistry he holds a high rank, and the result of his labors can be found in his memoirs inserted in the *Annalen* of Poggendorff. His "Manual of Analytical Chemistry" (2 vols., Brunswick, 1851) was translated into French, English, and Swedish shortly after its appearance, and has obtained wide celebrity. In 1845 he discovered a new metal in the tantalites of Bavaria, which he called niobium.—GUSTAV, a German mineralogist, brother of the preceding, born in Berlin in 1798. In 1816 he went to Silesia to pursue his studies in the mines of that country, but on account of his health returned and betook himself to the theoretical study of mineralogy and chemistry. In 1820 he took his degree in Berlin, in 1821 studied under Berzelius at Stockholm, in 1822 became keeper of the mineralogical collection in the university of Berlin, and in 1826 was made extraordinary and in 1839 ordinary professor of mineralogy in that institution. Beside several essays in Poggendorff's *Annalen*, he has written *Elemente der Krystallographie* (2d ed., Berlin, 1838); *Ueber das Krystallisationssystem des Quarzes* (Berlin, 1846); and *Das krystallochemische Mineralsystem* (Leipzig, 1852). With Humboldt and Ehrenberg he made in 1829 a journey to northern Asia, an account of which he gave in a work entitled *Reise nach dem Ural, dem Altai und dem Kaspiischen Meer* (2 vols., Berlin, 1837-'42).

ROSE BUG, a diurnal beetle of the melolonthian group, the *melolontha subspinosus* (Fab.) or *macrodactylus subspinosus* (Lat.). It is about  $\frac{1}{8}$  of an inch long, buff yellow above and white below, with a slender body tapering before and behind, entirely covered with very short ashy yellow down; thorax angularly widened in the middle of each side, which suggested the specific name; the legs slender, yellow or pale red, with the joints of the feet very long and tipped with black. This insect, though one of the greatest pests in gardens and nurseries, was unknown in northern New England until within 40 years; its annual appearance coincides with the blossoming of the rose, whence the common name; it attacks also grape vines, young apples and other fruits, garden vegetables, corn, forest trees, and even grass, devouring flowers, leaves, and fruit. They arrive in swarms unexpectedly, and disappear as suddenly; they emerge from the ground about the 2d week in June, and remain 30 or 40 days, when the males die, and the females enter the earth, lay their eggs, and return to the surface to perish; the eggs are about 30, nearly globular, whitish,  $\frac{1}{10}$  of an inch in diameter, placed from 1 to 4 inches below the surface, and hatched in 20 days. The larvæ begin at once to feed on tender roots, and by the autumn are nearly  $\frac{1}{4}$  of an inch long and  $\frac{1}{8}$  of an inch in diameter; they are yellowish white, bluish toward the posterior end, with a few short hairs; there are 6 short legs, a pair to each of the first 3 rings behind the head, the last part covered with a horny shell of a pale

rust color; in October they descend below the reach of frost, and pass the winter in a torpid state; in the spring they come toward the surface and form little shells of earth, within which they are transformed during May into pupæ; these are yellowish white, with stump-like wings, legs, and antennæ folded on the breast, and the whole enclosed in a filmy skin which is rent in June, and the perfect beetle digs its way to the surface. As they are beyond our reach during the egg, larva, and pupa states, they can only be exterminated as perfect insects; they are destroyed by crushing, scalding, and burning, after being shaken daily from the infested plants. They are occasionally found in immense numbers on the flowers of the worthless whiteweed (*chrysanthemum leucanthemum*); in this case it is expedient to mow it, and consume it with the bugs on the spot. It is stated that they never infest the cinnamon rose. This is one of the most destructive of insects, in some places in the West having consumed year after year the crop of young apples; choice fruits in such cases can only be preserved by covering them with millinet or similar netting. Insectivorous birds earn a right to man's protection for their valuable services in devouring these beetles; moles and various predacious animals and insects also eat them; young chickens are said sometimes to be killed by the irritation produced by the prickly feet and sharp claws of these insects which they have swallowed.—The European rose chafer is another allied lamellicorn beetle, the *cetonia aurata* (Fab.).

ROSE OF JERICHO. See JERICHON, ROSE OF.

ROSELLINI, IPPOLITO, an Italian Egyptologist, born in Pisa, Aug. 13, 1800, died in Florence, June 4, 1843. He was graduated at the university of Pisa in 1821, and afterward studied the oriental languages at Bologna with Mezzofanti. In 1824 he was appointed professor of oriental languages in the university of Pisa. He became a disciple of Champollion in the study of Egyptian hieroglyphics in 1825, and when in 1826 that scholar, for the further development of his system, examined the Egyptian monuments in Rome, Naples, and Turin, Rosellini attended him, and upon the conclusion of Champollion's examination accompanied him to Paris, where he spent the autumn of that year in similar researches. In 1827 the grand duke of Tuscany, Leopold II., granted Rosellini leave of absence for a year and a half with funds for himself and 6 companions to personally explore the monuments of Egypt. The government of France in the same year authorized a similar expedition, composed of Champollion and 5 others; and both parties embarked together at Toulon in July, 1828, and during the succeeding 15 months examined all the principal monuments of Egypt and Nubia. Rosellini returned to Pisa in 1830, and commenced a course of lectures on hieroglyphics. The results of both the French and

Italian expeditions were to have appeared in a joint production by Champollion and Rosellini; but on the death of Champollion in 1832, Rosellini was left alone to recount the results of the Tuscan exploration. The completion of the work was delayed by an illness of two years. After his return he had been appointed librarian of the university of Pisa, and in 1839 he began a series of archaeological lectures; but in 1841 he gave up all other labor to devote himself to Egyptology. His great work is entitled *I monumenti dell'Egitto e della Nubia* (Florence, 1832-45). It is in 8 parts, each of which is comprised in one large folio volume of plates with descriptive text in octavo. The first volume of plates contains the historical monuments, the second the civil monuments, and the third the monuments of religious worship. There are 8 volumes of text.

ROSEMARY (Lat. *rosmarinus*, sea dew), a low, shrubby bush with persistent leaves and purplish flowers, belonging to the natural order *lamiaceæ*. The common rosemary (*rosmarinus officinalis*, Willd.) grows to the height of 4 to 5 feet, with sessile, linear, entire leaves, woolly beneath; the flowers are not numerous, and are borne in the axils, the corolla of a dull leaden blue, its tube exerted beyond the calyx. There are gold and silver leaved varieties. Another variety with broader leaves, and by some considered a distinct species, will grow 10 to 12 feet high if trained to a wall. The common rosemary prefers a rather poor and lean soil, and flourishes when planted in the rubbish of old walls. It has been known in English gardens for a long period. In the United States it is not often seen, being too tender to endure the winter unless in a southern latitude. In parts of Europe the plant is cultivated to feed bees, producing honey of the finest sort; in such districts the air is redolent with the perfume of its blossoms. At one time the rosemary was in high repute, being used at marriages, funerals, and on festive occasions. In parts of Germany it was cultivated in pots by commercial gardeners, to furnish sprigs of flowers in winter and spring on religious occasions. The odor of the entire plant is fragrant and aromatic, and its taste pungent and bitter. The oil of rosemary used in pharmacy is procured by distillation of its leaves and flowers; and an artificial kind is prepared by distilling oil of turpentine with rosemary and adulterating with oil of spike or lavender.

ROSEN, FRIEDRICH AUGUST, a German orientalist, born in Hanover, Sept. 2, 1805, died in London, Sept. 12, 1837. He studied the elements of Sanscrit with his father, and afterward pursued that language with Prof. Bopp. In 1826 he published his *Corporis Radicum Sanscritarum Prologus*, subsequently enlarged under the title of *Radices Sanscritæ*. He also studied Arabic and Persian, and in 1836 became professor of oriental languages in the university of London, which position he afterward exchanged for the professorship of Sanscrit.

He also held the position of secretary to the oriental translation committee, and honorary foreign secretary to the royal Asiatic society. He published in 1830 his *Rig Veda Specimen*, and edited Ibn Khallikan's biographical dictionary, which was left unfinished at his death. Among his other literary labors was a revision of the Bengalee, Sanscrit, and English dictionary of Sir Graves Haughton.

ROSENKRANZ, JOHANN KARL FRIEDRICH, a German philosopher, born in Magdeburg, April 23, 1805. He studied at the universities of Berlin, Halle, and Heidelberg. In 1831 he was appointed extraordinary professor at Halle, and in 1833 he accepted the professorship of philosophy in Königsberg, which he still holds. His labors have in a great measure been devoted to disseminating the ideas of Hegel, which he has sought to apply to history, to literature, to theology, and even to the ordinary business and concerns of life. On this subject he has written extensively. In conjunction with F. W. Schubert he has edited the works of Kant in 12 vols., to the last of which he appended a "History of the Philosophy of Kant."

ROSENMÜLLER, JOHANN GEORG, a German theologian, born in Ummerstädt, Saxe-Meiningen, Dec. 18, 1736, died in Leipsic, March 4, 1815. He was in 1775 appointed professor of theology at Erlangen, whence in 1783 he removed in the same capacity to Giessen. In 1785 he was called to the chair of theology at Leipsic, and at the same time made superintendent of the Lutheran church in that city, both of which positions he held during the remainder of his life. His chief works are: *Historia Interpretationis Librorum Sanctorum in Ecclesia Christiana, ab Apostolorum Etate ad Literarum Institutionem* (5 parts, 8vo., Leipsic, 1795-1814), and *Scholia in Novum Testamentum* (5 vols. 8vo.), the latter once much esteemed by biblical students.—ERNST FRIEDRICH KARL, son of the preceding, born in 1768, died in Leipsic, Sept. 17, 1835. He was educated in the university of Leipsic, in which during the latter part of his life he held the professorship of oriental languages. His chief work is his *Scholia in Vetus Testamentum* (23 vols. 8vo., Leipsic, 1795-1826; 2d ed., 1823-'34), an elaborate commentary, not less remarkable for the oriental learning than for the patient industry displayed on every page. It was not completed by the author according to his original plan. A "Compendium of the Scholia," containing the Pentateuch, the Psalms, Job, and the prophets, was executed by Dr. J. C. Lechner, with the coöperation of the author, in 5 vols. He also published, beside other works, a *Handbuch der biblischen Alterthums-kunde* (4 vols. 8vo., 1823-'31), comprising 3 vols. on the geography and one on the natural history of the Bible.

ROSETTA (Arabic, *Rashid*), a town and seaport of lower Egypt, on the westerly or Bolbitine mouth of the Nile, 86 m. E. N. E.

from Alexandria; pop. about 14,000. It was founded about 870 by one of the caliphs, near the site of the ancient Bolbitinum. The completion of the Mahmoudieh canal has taken away most of its traffic and manufactures. The port is secure when entered, but is difficult of entrance, owing to a shifting sand bar at the mouth of the river. The trilingual inscription known as the "Rosetta stone," which formed the key to the discoveries of Young and Champollion, was found here. (See **HIEROGLYPHICS**.)

ROSEWOOD, a name rather indefinitely applied to the timber of a variety of trees obtained in different parts of the world, and used for ornamental furniture. That from Rio Janeiro, which is the most esteemed, is the wood of a species of mimosa, known as the *jacaranda*, and possesses a faint but agreeable odor of roses. It is a resinous tree, and contains so much gum and oil as to be very inflammable. It is imported in large slabs or halves of trees, which are sometimes 22 inches wide. The colors are from light hazel to deep purple or nearly black, and appear in irregular stripes often abruptly contrasted. The wood is very heavy, and sometimes fine and again coarse-grained. It is esteemed more highly than mahogany, though much inferior to it in strength. Several other sorts are known in Brazil. From the West Indies and Central America a variety of rosewood is obtained, the product of the *amyris balsamifera*. Other woods known as rosewood are obtained in the East Indies, the Canary isles, and Africa.

ROSICRUCIANS, the name of a secret society whose existence was first made known in the 17th century. In the beginning of that century appeared several works in regard to the order, which are now usually ascribed to Johann Valentin Andreæ, a German Lutheran divine, among which is "The Discovery of the Brotherhood of the Honorable Order of the Rosy Cross" (Frankfort, 1617). In this work there is a story of a certain Christian Rosenkreuz, a German noble of the 14th century, who had spent a large portion of his life among the Brahmins, in the pyramids of Egypt, and in other parts of the East, in the pursuit of wisdom. After returning to Germany he established a secret society, consisting of but few members, which met in a building erected by himself and called Sancti Spiritus, where he died at the age of 106, after having ordered the following words to be inscribed upon one of the doors of the edifice: *Post CXX annos patebo*. The spot where he was buried was kept secret, and new members were silently admitted from time to time to keep up the numbers of the society. To this work was added another under the title of "Revelation of the Fraternity of the Holy Cross to the Learned of Europe," in which a declaration was made that the order had no intention of interfering with the religious or political action of states, but only desired the improvement of mankind by the discovery of the true philoso-

phy; that meetings were held once a year to admit new members, and to deliberate upon secret matters; and that many untrue statements had been made in regard to the order. Whether such a fraternity ever existed, except in the brain of the author of the above mentioned works, is an open question; for the secret in regard to all its transactions, if there be any secret, has been kept to the present time. But the impression that such an organization did exist gave rise to a number of fraternities that subsequently spread over Europe, and the term Rosicrucian came to be applied to all kinds of occult skill. Efforts have been made to prove that the order was connected with that of the free masons, the illuminati, and other secret societies. The fraternity had not been heard of for a long period, when in the latter half of the 18th century interest in their organization was revived, especially by Cagliostro, who pretended that he was a Rosicrucian. Fuller information in regard to this subject may be obtained in J. G. Buhle's work entitled *Ueber den Ursprung und die vornehmsten Schicksale der Orden der Rosenkreuzer und Freimaurer* (Göttingen, 1804), in which the Rosicrucians are thought to be a branch of the free masons.

ROSIN. See RESINS.

ROSMINI, CARLO, an Italian author, born in Roveredo, southern Tyrol, in 1758, died in Milan in 1827. He commenced his literary career in 1789 with a "Life of Ovid," which gained him admission to the Florentine academy. One of his most important works is his "History of Milan in 18 Books," extending from the reign of Frederic Barbarossa to 1535, the date of the annexation of the city to the hereditary possessions of the house of Hapsburg.

ROSMINI SERBATI, ANTONIO, an Italian ecclesiastic and philosopher, born in Roveredo, March 25, 1797, died at Stresa, July 1, 1855. He was the only son of an ancient and noble family, but was strongly inclined to a clerical life, and took priest's orders at the age of 24. His taste for philosophy manifested itself early; he was not yet 30 years old when he published his *Introduzione alla filosofia*, and this was followed in 1829 by *Il nuovo saggio sul l'origine delle idee*, in which may be found the germs of his new system of philosophy (see PHILOSOPHY, vol. xiii. p. 270), which he afterward expanded in works on moral, intellectual, and political science, education, statistics, marriage, social justice, theology, and ontology. In 1828 he founded a new religious order, "the brethren of charity," which was confirmed by the pope in 1839. Their work embraces the care of the poor, the sick, and infirm, and especially the instruction of the children of the poor. This order has now (1861) several houses in northern Italy, 2 in France, and 7 in England. His only sister, Josefa Margarita, founded soon after a corresponding female order, "the daughters of charity." In 1836 Charles Albert offered Rosmini the abbacy of S. Michele della

Chiusa; he accepted the administration, but declined its honors and titles. Here he founded an institution of young ladies called "the sisters of providence," whom he trained as teachers of elementary schools for girls and of infant asylums. He also organized in the Rosminian institute, one of the houses of the order of charity, erected at his own expense at Stresa, a normal college for training male teachers. In 1848 Pius IX. nominated him to the cardinalate; but his work on church government and reform, *Cinque piaghe della santa chiesa* ("Five Wounds of the Church"), and one of his political tracts, *La costituzione secondo la giustizia sociale*, were so distasteful to the college of cardinals that he was not confirmed, and the books were put upon the catalogue of the *Index Expurgatorius*. He was a laborious student; at his death his published works amounted to 21 volumes, and 14 more left in manuscript were published posthumously. They embrace the whole range of philosophical study. Father Lockhart, an English member of the order of charity, published a memoir of Rosmini in 1856, and Vincenzo Garelli another in 1861.

ROSS, a S. co. of Ohio, intersected by Scioto river and drained by Paint creek; area, about 650 sq. m.; pop. in 1860, 35,071. It has a diversified surface, and the soil, especially in the valley of the Scioto, is very fertile. The productions in 1850 were 2,840,443 bushels of Indian corn, 141,131 of wheat, 80,926 of oats, and 61,964 lbs. of wool. There were 17 grist mills, 21 saw mills, 2 iron foundries, 4 woollen factories, 15 tanneries, 6 newspaper offices, 72 churches, and 7,324 pupils attending public schools. It is intersected by the Marietta and Cincinnati railroad, and by the Ohio and Erie canal, both of which pass by the capital, Chillicothe.

ROSS AND CROMARTY, two N. counties of Scotland, which, being politically connected, are generally treated under one head. They are bounded N. by Sutherlandshire, E. by the North sea, S. by Inverness-shire, and W. by the Atlantic; area, including the N. portion of the island of Lewis, one of the Hebrides, which belongs to Ross-shire, 3,151 sq. m.; pop. in 1851, 82,707. The two counties extend across the island from the German ocean to the Atlantic, and both coasts are indented with numerous bays and excellent harbors. There are several rivers and lakes, and the general surface of the country is mountainous. The scenery is remarkably wild and romantic. The principal towns are Dingwall, Tain, and Cromarty. There are no manufactures of any importance; but the fisheries on the coasts employ upward of 20,000 hands during the season. These counties contain many remains of antiquity. They have one sheriff, and return one member to parliament.

ROSS, FREDERIC AUGUSTUS, D.D., an American clergyman, born in Richmond, Va., in 1796. He was educated at William and Mary's college, and after his father's death in 1818 removed

to Kingsport, Hawkins co., East Tennessee, where he resided 36 years. In 1823 he connected himself with the Presbyterian church, and not long afterward emancipated his slaves. Having studied theology, he was ordained to the ministry in 1825, took charge of a small church at Kingsport, and edited for several years, conjointly with the Rev. Messrs. James Gallaher and David Nelson, a monthly publication called the "Calvinistic Magazine," commenced in 1827. In 1828, together with Mr. Gallaher, he labored as an evangelist with great effect in Kentucky and Ohio. At the division of the Presbyterian general assembly in 1837-'8, he adhered to the "New School" portion. He received the degree of D.D. from the university of Vermont in Aug. 1851. In 1855 he became pastor of the first Presbyterian church of Huntsville, Ala., where he now resides. He took a prominent part in the debates on slavery in the general assembly, which resulted in the separate organization, in April, 1858, of the united synod of the Presbyterian church. In 1857 he published a work entitled "Slavery Ordained of God," taking the highest ground in defence of the system as a divine institution.

ROSS, GEORGE, one of the signers of the declaration of independence, born in New Castle, Del., in 1730, died in Lancaster, Penn., in July, 1779. He commenced the practice of law at Lancaster in 1751, and was a member of the colonial assembly of Pennsylvania from 1768 to 1776. In 1774 he was chosen one of the committee of 7 who represented Pennsylvania in the continental congress, and continued his connection with the congress till Jan. 1777, when he retired on account of ill health. For his conduct in congress the sum of £150 was voted to him by the county of Lancaster, which he declined to accept. In 1775 he drew up a reply to Gov. Penn's message deprecating any action on the part of the colony. After the substitution of the general convention for the legislature of Pennsylvania, Mr. Ross was also elected to that body, and prepared a declaration of rights for the state, the regulations necessary for the government of the convention, and an ordinance for the punishment of treason. A report on the measures necessary for putting the colony and the city of Philadelphia in a state of defence was also from his pen. In April, 1779, he was appointed judge of the court of admiralty.

ROSS, SIR JOHN, a British navigator, born at Balsarroch, Scotland, June 24, 1777, died in London, Aug. 30, 1856. His father was a clergyman of the Scottish church. He shipped as a volunteer on the frigate *Pearl* at the age of 9 years, served in the Mediterranean till his 18th year, and continued in the navy till 1791, after which for several years he was engaged in the merchant service. In 1799 he became a midshipman on board the sloop of war *Weasel*, and in 1805 was promoted to a lieutenantcy. The next year he received a

number of severe wounds in a desperate engagement, for which two years later he was pensioned. In 1812 he was appointed to the command of the *Briseis*, and subsequently of other vessels. In 1817 he was offered the command of the larger of two vessels to be sent out to settle the question of the existence of a north-west passage, and on April 25, 1818, set sail from the Thames in the *Isabella*, accompanied by Lieut. Parry in the *Alexander*. (See *ARCTIC DISCOVERY*.) He was promoted to the rank of post-captain on his return, and published an account of his voyage. In 1829 he made a second voyage of discovery to the arctic regions, not under government patronage, but in a badly constructed steamship called the *Victory*, equipped at the expense of Sir Felix Booth, sheriff of London, and accompanied by a small tender of 16 tons, called the *Krusenstern*. He was frozen up in the ice for 4 years, and was finally rescued with his crew by a whaler in August, 1833, after abandoning his ship in May, 1832. On Dec. 24, 1834, he was made a K.C.B. In 1839 he was appointed consul at Stockholm, where he remained till 1845. In 1850 he went out in search of Sir John Franklin in a small vessel of 90 tons, and remained one winter in the ice. He attained the rank of rear admiral in 1851. He published "A Voyage of Discovery" (2 vols. 8vo., London, 1819), and "A Narrative of a Second Voyage" (2 vols. 4to., 1835-'6), "A Treatise on Navigation by Steam" (4to., 1828), &c.—SIR JAMES CLARK, a British navigator and discoverer, nephew of the preceding, born in London, April 15, 1800. At the age of 12 he entered the royal navy as a volunteer on board the *Briseis*, then commanded by his uncle. He accompanied Capt. Ross in 1818 as midshipman on his first arctic voyage, subsequently was an officer under Parry in his 4 voyages between 1819 and 1827, and was promoted while absent on the 2d voyage to the rank of lieutenant. In 1827, on his return from the 4th voyage, he received a commission as commander. In his uncle's second expedition, 1829-'33, during their imprisonment in the ice, he made numerous exploring tours, in one of which he discovered the north magnetic pole, in lat. 70° 5' 17" N., long. 96° 46' 45" W., where the dipping magnetic needle indicated a dip of 89° 59', or within 1' of a vertical position. He was promoted to the rank of post-captain on his return in 1834. The next year he again visited Baffin's bay to search for and relieve some missing whale ships, and after his return was employed for several years in making a magnetic survey of Great Britain and Ireland. In 1839 he commanded the *Erebus*, to which, with the *Terror*, Commander Crozier, was assigned the duty of exploring the Antarctic ocean. In this voyage, which occupied 4 years, he made many valuable discoveries in magnetism, geography, and the geology, zoology, and botany of the antarctic regions. He made an independent discovery of the antarctic continent, which Commander

Wilkes, U. S. N., had a few months before discovered and traced at a different point, and gave it the name of Victoria Land; a volcano, 12,000 feet high, was named Mt. Erebus from his vessel. He returned in 1843, and in 1844 was knighted. In 1848 he was appointed to the *Enterprise*, and made a voyage to Baffin's bay in search of Sir John Franklin. His only published work is "A Voyage of Discovery and Research in the Southern and Antarctic Regions" (2 vols. 8vo., London, 1847).

ROSS, JOHN, or KOOWESKOOWE, a chief of the Cherokee Indians, born in the Cherokee country, Georgia, about 1790. He is a half-breed, and at an early age had acquired a good English education. The state of Georgia attempted in 1817 and 1819 to induce the Indians to remove west of the Mississippi, and for this purpose a liberal bribe was offered to Ross by McIntosh, a Creek half-breed chieftain, but it was repulsed, and the Creek was publicly disgraced. The proceedings of the Georgia legislature with reference to the Cherokees in 1829 led to an appeal on the part of the Indians, Ross acting as their agent, to the supreme-court of the United States, which resulted in a decision in their favor. Georgia however refused to obey, and aggressions upon the Indians increased. In 1835 a treaty was concluded between J. F. Schermerhorn, an agent of the United States, and Major Ridge, his son John Ridge, Elias Boudinot, and about 600 other Cherokee Indians, including men, women, and children, agreeing to surrender their lands, and remove west within two years. Against this treaty, known as the treaty of New Echota, Ross and over 15,000 of his tribe protested in an appeal written by Ross and addressed to the president of the United States, as having been fraudulently obtained. The government, however, sent a force under Gen. Scott to compel the fulfilment of the treaty. The Cherokees yielded, and with Ross at their head removed to their new home, a moderate allowance being made them for their losses by the government; and after several years of suffering they have at last become again a prosperous nation. In accordance with their laws, though against the will and efforts of Ross, the two Ridges and Boudinot were put to death by the tribe for their treachery. Ross has continued to be the principal chief of the Cherokees, and in 1861, after some hesitation, entered into a treaty with the seceding states.

ROSSANO (anc. *Roscianum*), a fortified city of S. Italy, province of Calabria Citra, 2½ m. from the gulf of Taranto, and 25 m. from Cosenza; pop. about 12,000. It is built upon a rocky hill at the foot of the Apennines, and surrounded by deep precipices. It has a fine cathedral, is the seat of an archbishop, and is the birthplace of 3 popes, viz.: St. Zosimus, John VII., and John XVII. *Roscianum* was a very ancient town; it was early rebuilt and colonized by the Romans, and was taken by assault and pillaged by Totila.

ROSSBACH, a village of Prussian Saxony, 17 m. S. of Halle, celebrated as the scene of the victory of Frederic the Great over the combined French and imperial army under the prince of Soubise and the prince of Hildburghausen, Nov. 5, 1757. The army of Frederic numbered 25,000, and that of his opponents 50,000, the French being officered by members of the high nobility who regarded the expedition as a pleasure excursion. Emboldened by his having retired from before the duke de Broglie's camp at Mülhausen, the French and imperial army left a strong position to attack Frederic without having made a reconnoissance; but they were themselves attacked by surprise, and, though but one wing of the Prussians was engaged, soon broke and fled in the utmost disorder, leaving their whole artillery and baggage in the hands of the victor.

ROSSE, WILLIAM PARSONS, earl of, a British astronomer, born in York, June 17, 1800. He was educated at Magdalen college, Oxford, and in 1822 graduated first class in mathematics. From 1821 to 1834, under the title of Lord Oxmantown, he represented King's county, Ireland, in parliament. At the death of his father, the second earl, in 1841, he succeeded to the peerage, and in 1845 was elected one of the representative peers for Ireland. In parliament he voted with the liberal party. In 1826 he erected upon the grounds of his residence, Birr castle, near Parsonstown, King's county, an observatory for which instruments were made under his special direction. Of these the most important was the enormous reflecting telescope, which required several years and a vast expenditure of money to overcome the difficulties of producing large specula out of speculum metal, and of accurately adjusting and suspending the various parts of the heavy machinery. The telescope was finished in 1844 at a cost of about \$60,000; it has an aperture of 6 feet and a focus of 53, weighs over 3 tons, and is now the most powerful reflector in the world. By its great space-penetrating capacity, its owner has been enabled to question some scientific theories previously entertained, especially Herschel's theory of condensation and Laplace's theory of cosmogony. It has been of especial use in the resolving of nebulae, for which it was in great measure designed, and has also imparted much additional knowledge in regard to the visible surface of the moon. In 1843 Lord Rosse was made president of the British association, and from 1849 to 1855 presided over the royal society.

ROSSELLI, COSIMO, an Italian painter, born in Florence probably in 1439, died about 1507. Few of his works are now in existence. His frescoes in the Sistine chapel, representing subjects from the history of the Israelites and of the Saviour, were painted for a prize in competition with works in the same chapel by Perugino, Ghirlandaio, and others, and, being loaded to excess with brilliant color and gilding, gained the attention of the pope, who be-



stowed upon Rosselli the prize. He was the master of Fra Bartolomeo.

ROSSETTI, DANTE GABRIEL, an English painter, born in London, about 1828. He is known chiefly in connection with the pre-Raphaelite movement in British art, of which, in conjunction with Millais and William Holman Hunt, he has been an earnest promoter. Among his pictures, which have seldom been exhibited, are "The Girlhood of the Virgin," "A Christmas Carol," "The Wedding of St. George," and "Dante's Dream on the Day of the Death of Beatrice."

ROSSI, PELLEGRINO, count, an Italian statesman, born in Carrara, Modena, July 13, 1787, assassinated in Rome, Nov. 15, 1848. He was educated for the bar, and practised his profession in Bologna until 1814, when his complicity with Murat obliged him to leave Italy. Establishing himself in Geneva, he became professor of criminal law in the academy, a member of the council, and deputy to the diet, in which he zealously advocated the centralization of the federal power. Having been sent as envoy to Paris, he was induced in 1833 to take up his residence there, and in 1834 was appointed professor of political economy in the college of France and of public law to the Parisian faculty of law. He became the friend of Guizot, and by his "Treatise on Penal Law," his "Course of Political Economy," and his numerous contributions to the *Revue des deux mondes*, attracted the notice of Louis Philippe, who in 1840 created him a peer of France. Subsequently he was appointed a member of the council of state, and in 1845 was sent as ambassador to the papal court, and exerted all his influence in favor of the liberal policy inaugurated by Pius IX. Soon after, in obedience to the directions of Louis Philippe, he endeavored to check the reformatory zeal of the pope, and thereby became an object of detestation to the liberals. Deprived of his employments by the revolution of 1848, Rossi retired for a short time to Carrara; but upon the entrance of the Austrians into the papal territories he repaired to Rome, and, having offered to reorganize the states of the church without violence or foreign assistance, was appointed by the pope minister of the interior, with charge of the finances and the police. In spite of anonymous warnings he repaired on Nov. 15 to the palace of the Cancellaria, to attend the opening of the parliament of the Papal States, having been elected to represent Bologna in that body. As his carriage stopped at the portico of the building, it was suddenly surrounded by a crowd of bystanders, and in the confusion which ensued the minister was stabbed with a stiletto, expiring a few minutes after being taken into the palace. In 1854 a man named Constantini was found guilty of murdering Count Rossi, and executed.

ROSSINI, GIOACHINO, an Italian composer, born in Pesaro, near Bologna, Feb. 29, 1792. His parents were members of a strolling theat-

rical company, and at 10 years of age he was able to accompany his father, who was a horn player in the orchestra. Soon after he was placed with a music teacher in Bologna, under whose instructions he developed a soprano voice of great purity and compass; and at 14 he could sing at sight any piece of music placed before him. After being employed for several years as a chorister in the Bolognese churches, and occasionally as chorus master in little provincial theatres, he was induced in 1807 by the breaking of his voice to enter the lyceum of Bologna, where he was instructed in counterpoint by Padre Mattei. The severe course of study to which pupils were here subjected was distasteful to Rossini, who, hearing his master observe one day that simple counterpoint would suffice for ordinary stage composition, determined to become a writer of operas, and forthwith left the school, having acquired just enough of the science of harmony to enable him to enter upon his vocation. He now studied day and night the works of the principal opera writers, German as well as Italian, giving especial attention to those of Mozart; and at 18 years of age, having tried his hand at some minor pieces, he produced his first dramatic work, *La gamba di matrimonio*, an operetta performed with moderate success at the theatre San Mose in Venice, although his *Demetrio e Polibio*, produced in Rome in 1811, is said to have been written two years earlier. In 1812 he composed not fewer than 5 operas, all of which, with the exception of *L'inganno felice*, speedily sunk into oblivion. In the succeeding year he appeared before the Venetians with 3 operas, one of which, *Tancredi*, excited an enthusiasm almost without a parallel in the history of music, and within 3 years found its way into every musical theatre of Europe and America. Of the remaining operas composed in 1813, the *Italiana in Algieri* was almost equally successful, and with *Tancredi* still holds possession of the stage. In the following year he produced at Milan *Aureliano in Palmira* and *Il Turco in Italia*, the latter of which is still frequently performed; and in 1815 *Elisabetta regina d'Inghilterra* for the San Carlo theatre of Naples, where he also accepted an engagement as musical director. This, however, did not preclude him from writing operas for other places, and in 1816 his *Barbiere di Siviglia*, probably the most admirable specimen of the Italian *buffo* opera in existence, was performed in Rome during the carnival with a success which, after the lapse of nearly half a century, has suffered no diminution. According to Manuel Garcia, for whom the *Barbiere* was written, the greater part of it was composed in 8 days. In 1816-'17 he composed for the San Carlo and other theatres upward of 7 operas, 3 of which, *Otello*, *Cenerentola*, and *La gazza ladra*, are yet standard favorites—the first a striking example of his forcible style, and the second of his skill in producing florid embellishments. His *Mosè in Egitto*

(1818) ranks among the finest serious operas of the age. Within the next few years were produced *La donna del lago*, *Maometto Secondo*, *Zelmira*, and a number of minor works, showing a gradual increase of power in harmony and instrumental effects, with no loss of melodic beauty; and in 1823 he took his leave of the Italian stage with the opera of *Semiramide*, the most elaborate and gorgeous of his works up to that period. In the same year he was married to Mme. Colbran, a prima donna at the San Carlo, for whom many of his parts were written; and in 1824 he visited London with his wife under an engagement to compose an opera for the king's theatre. An indolent carelessness now took the place of his former activity; he neglected his duties, failed to produce his promised opera, and made the season ruinous to the lessees of the theatre. His visit however was profitable to himself, and he left England with £10,000, derived principally from concerts got up for him by the leaders of fashionable society at enormous prices of admission. Repairing to Paris, he accepted the position of director of the Italian opera, an office which he held until 1830, with little increase of professional celebrity, but with considerable profit. For 3 years he composed nothing new except a slight piece called *Il viaggio a Rheims*, a portion of which was reproduced in a graceful French opera, entitled *Le comte Ory*; although several of his former works were brought out with success, including his *Maometto* under the title of *Le siège de Corinthe*. In 1829, however, he made amends for his indolence by the production of *Guillaume Tell*, generally considered his masterpiece in serious composition, a work abounding in beautiful melodies and in rich and varied instrumentation, but so different in style from any of his previous operas, that it seems the creation of another mind. After this, with the exception of his *Stabat Mater*, a pleasing composition, but rather operatic than ecclesiastical in its character, for many years he wrote nothing. During his residence in Paris he was appointed by Charles X. inspector-general of singing with a liberal salary, from the enjoyment of which he was cut off by the revolution of 1830. He remained several years in Paris, occupied in claiming compensation for losses he had sustained, and in 1836 retired to an elegant villa near Bologna, where for nearly 20 years he principally resided, refusing the most tempting offers to write for the stage, on the ground that he was unwilling to endanger his reputation by the production of inferior works. He is said to have in his possession the manuscript of an opera never yet performed, which, notwithstanding the solicitations of managers, has not seen the light. A comic trifle called *Bruschino*, comprising a collection of his youthful improvisations and impromptus, was however performed in Paris in 1857. Visiting Paris in 1855 for the benefit of his health, he has since passed a large portion of each year there, and during the musical season may be seen at many of his

former resorts, a genial, well preserved old gentleman, full of anecdotes and reminiscences of musical history in Europe during the past half century. Beside his operas, numbering about 40, and his *Stabat Mater*, he has written at different times cantatas, hymns, and a few miscellaneous vocal and instrumental pieces, not comparable in merit with his dramatic compositions. The latter amply illustrate the richness and variety of his melodies, his consummate skill in writing for the voice, and the intimate and natural association of florid ornament with the body of the music, which constitutes his peculiar style. There is a life of Rossini by Stendahl (Paris, 1823-'54), and one by the brothers Escudier (Paris, 1854).

ROSTOCK, a fortified town of Mecklenburg-Schwerin, situated on the left bank of the Warnow, about 9 m. above its mouth, and 131 m. N. E. from Hamburg; pop. in 1855, 24,228. It has a university founded in 1419, and having in 1856 32 professors and teachers, and 97 students, with a library of 80,000 volumes. Rostock is a place of great antiquity, and was once a member of the Hanseatic league, from which it separated in 1492.

ROSTOPTCHIN, FEDOR, count, a Russian general, born at Livna, in the government of Orel, March 12, 1765, died in Moscow, Feb. 12, 1826. At the age of 21 he was a lieutenant-general in the imperial guards. Enjoying the favor of the court, he was rapidly advanced, and held many principal places, civil and military, under the government. He afterward fell into disgrace, but was restored by Alexander I. He was governor of Moscow in 1812, and is believed to have caused the burning of that city upon its capture by the French. This, however, he denied in a French pamphlet entitled "The Truth concerning the Burning of Moscow" (Paris, 1823).

ROSTRA (Lat., beaks), in ancient Rome, the stage in the forum from which the orators spoke, so named from being adorned with the beaks of the ships taken from the people of Antium after the great Latin war (338 B. C.), previous to which it had been called *templum*. In form Bunsen supposes "that it was a circular building raised on arches, with a stand or platform on the top bordered by a parapet, the access to it being by two flights of steps, one on each side." The ancient rostra stood between the comitium and the forum, so that the speaker might front either the curies or the tribes, the former being the universal custom, however, down to the time of C. Licinius Crassus (145 B. C.) or Caius Gracchus. Julius Cæsar built new rostra in a corner of the forum, known as the *rostra nova* or *rostra Julia*. The term rostrum in English is applied to any stage or platform used for secular oratory.

ROT, DRY. See DRY ROT.

ROTATION. See GYROSCOPE, and MECHANICS, vol. xi. p. 323.

ROTH, JOHANNES RUDOLF, a German naturalist and traveller, born in Nuremberg, Sept.

4, 1815, died in Hasbeiya, Palestine, June 26, 1858. He was educated at the university of Munich, and in 1836-'7 made an extensive tour through Syria and Palestine. In 1840 he went to Calcutta to assist Major Jervis, of the East India service, in the preparation of an elaborate work on the natural history of Hindostan. Upon the failure of this project, he accompanied the expedition under the direction of Major W. C. Harris to Shoa in southern Abyssinia, where he remained until the summer of 1843; and he subsequently wrote the geological, botanical, and zoological portions of Harris's "Highlands of Ethiopia." Returning to Munich, he was appointed assistant curator of the zoologico-zootypic museum, and extraordinary professor of zoology in the university. In 1852 he undertook another journey to the East; and in the latter part of 1856, being supplied with a travelling fund by the king of Bavaria, he departed on a third tour, in the course of which he died. He conducted during his last journey an important series of investigations concerning the geology of the Dead sea and the surrounding region, and explored carefully the course of the Jordan. His notes and journal of his travels are now (1861) preparing for publication. He was an occasional contributor to Petermann's *Mittheilungen*.

ROTHERMEL, PETER F., an American painter, born in Luzerne co., Penn., July 8, 1817. He was educated as a land surveyor, but upon removing at the age of 22 to Philadelphia he studied painting, and about 1840 commenced practice as a portrait painter, but soon turned his attention to historical subjects. Among his earlier works are "Christabel" and "Katherine and Petruchio." He has also painted "De Soto discovering the Mississippi," "Columbus before Isabella the Catholic," the *Noche triste* from Prescott's "Conquest of Mexico," and other pictures.

ROTHSCHILD, the name of a Jewish family of European bankers, whose founder was MAYER ANSELM (or ANSCHL) ROTHSCHILD, born at Frankfort-on-the-Main in 1743, died there in Sept. 1812. He was educated for a rabbi, but commenced business as a small trader, and eventually procured a situation in a Hanoverian banking house. Subsequently he returned to Frankfort, and established himself as a banker there, and the rich landgrave of Hesse, William IX. (who afterward, as elector of Hesse, took the title of William I.), made him his banker. Rothschild first became known as a negotiator of government loans in 1792, when the French general Custine imposed upon the senate of Frankfort a very heavy ransom, to be raised in a short time, as the alternative of the sack- ing of their city. The senate could devise no means of procuring the money, when the Jew- ish banker obtained it for them from the land- grave. His services in negotiating loans were afterward frequently in demand among the smaller states of Germany. In 1806 Napoleon decreed the forfeiture of the states of the sov-

ereigns of Hesse-Cassel and Brunswick, and sent an army to enforce his decree. The elector was unable to offer resistance, but he had \$5,- 000,000 in silver which he was unwilling to give up to Napoleon, and unable to carry with him in his flight. Sending for Roth- schild, he offered him the use of the money without interest, if he would remove it to a place of safety. The banker and his sons, whom he had associated with him in business, enjoyed the use of this large sum for 8 years; when Napoleon was banished to Elba, the elector gave notice that he should withdraw it; but when Napoleon escaped and returned to France, he was so much alarmed that he urged the Rothschilds to keep it at the interest of 2 per cent. per annum, which they did till 1823, when they returned it to his son and successor, having won by their faithful and able manage- ment the confidence of courts and financiers. Mayer Anselm Rothschild had 10 children, 5 of them sons, all of whom survived him. The eldest, ANSELM (born June 12, 1773, died Dec. 6, 1855), was his father's partner and successor at Frankfort. The second, SOLOMON (born Sept. 9, 1774, died July, 1855), at first the travelling partner of the firm, was eventually established in Vienna. The third, NATHAN MAYER (born Sept. 16, 1777, died at Frankfort, July 28, 1836), settled in London in 1798, and became the most prominent, as he was gener- ally deemed the ablest, financier of the family. CHARLES (born April 24, 1783, died March 10, 1855) settled at Naples in 1821. JAMES (born May 5, 1792) was for a time with his brother Solomon at Vienna, but eventually took up his residence in Paris. The 5 brothers constituted but one firm, in which all had an equal interest, but conducted their business under 5 branches, each under the charge of one of the brothers. Nathan Rothschild is said to have known of the result of the battle of Waterloo 8 hours before the British government, and to have realized over \$1,000,000 by a skilful use of that knowledge. The house for many years have been the principal takers of the loans of the European governments, and have in some in- stances compelled peace by refusing to furnish the sinews of war. Within a period of less than 12 years, they have furnished in loans \$200,000,000 to England, \$50,000,000 to Aus- tria, \$40,000,000 to Prussia, \$80,000,000 to France, \$50,000,000 to Naples, \$25,000,000 to Russia, \$12,000,000 to Brazil, and \$4,000,000 to some of the smaller states. Their prompt- ness, and the courtesy with which they re- sponded to Metternich's application for a loan in 1813, led the Austrian emperor to confer on each of the brothers a patent of nobility with the title of baron of the empire. Of the 5 brothers only James is now living, but the members of the family of the 8d, and even some of the 4th generation, have been taken into the partnership. The leading active partner is now Baron NATHAN LIONEL DE ROTHSCHILD of London, son of Nathan, born in London in

1808, and succeeding to his father's titles and connections in 1836. In 1847 he was elected a member of the house of commons from the city of London; but declining to take the ordinary oath "on the true faith of a Christian," he did not take his seat, although regularly reelected, till 1858, when, the disabilities being removed, he took his place in the house, being the first adherent of the Jewish religion who ever sat in the commons. Sir ANTHONY, born in London in 1810, the 2d son of Nathan, was created a baronet in 1846. The members of the family have very generally intermarried, so that their immense wealth will probably remain in a few hands for many years. They have met with few heavy losses, the only one of considerable amount being the result of the revolutions of 1848, by which they are said to have lost in 9 months about \$40,000,000; but so vast was their wealth, that even this did not in the least impair their credit or position. They have now banking houses in most of the large cities of the world.

ROTIFERA. See ANIMALCULES.

ROTHOU, JEAN, a French dramatic poet, born at Dreux, Normandy, in 1609, died in 1650. Cardinal Richelieu employed him among his "poet workmen," who filled up with verses the skeleton plots which that great minister had devised. Pierre Corneille loved him so much as to call him "father," although 3 years his senior. He composed no fewer than 17 tragicomedies, 7 tragedies, and 12 comedies. His tragic masterpieces are *Antigone*, *Iphigénie en Aulide*, *Cosroës*, and above all *St. Genest* and *Venceslas*, which rank among the best tragedies in French literature. He held a position as a magistrate at Dreux; and on the breaking out of a dangerous epidemic there he left Paris to return to his post, and died in the midst of his generous efforts to relieve the sufferings of the sick. His *Œuvres* have been published by Viollet-Leduc (5 vols. 8vo., Paris, 1820).

ROTTECK, KARL VON, a German publicist and historian, born in Freiburg, Baden, July 18, 1775, died there, Nov. 26, 1840. He was educated at the university of Freiburg, where his father was perpetual dean of the medical faculty. Although by profession an advocate, he devoted the greater part of his time to the study of history, and in 1798 was appointed to the professorship of that department in Freiburg, which he held until 1818, when, becoming interested in the study of the constitutional law of Germany, he obtained the chair of politics and the law of nations. He soon became an industrious writer on public law, and his newspaper articles and pamphlets on representative bodies, on the danger of maintaining large standing armies, and other subjects, attracted notice. Between 1819 and 1830 he represented the university of Freiburg in the first chamber of the states of Baden. In 1830 he was elected a member of the second chamber from the city of Freiburg. In that body his course gained him the enmity of the conserva-

tives, and in 1832, the reactionary tide having set in, he was forbidden by the diet of Baden to continue his lectures in the university, or to edit any newspaper for the space of 5 years. The liberal party at once took up his cause, and addresses of sympathy and presents were sent to him from all parts of Germany. He was also elected mayor of Freiburg, and returned by successive elections to the second chamber, the efforts of government being unavailing to exclude him from his seat. In 1840 he was permitted to resume his functions as lecturer in the university, but died soon after. As a historian Rotteck is widely known by his *Allgemeine Weltgeschichte* ("Universal History"), published between 1811 and 1827, and of which a 15th edition was produced in 1841-'5 in 11 vols. 8vo. The original work embraces the history of the world down to the year 1815, to which a continuation to 1840 was added by K. H. Hermes, forming vols. x. and xi. of the 15th edition. It is a critical narrative of prominent events, written from a liberal point of view, and enjoys a popularity in Germany and elsewhere in Europe superior to that of any other work of its class. Numerous translations of the original work, and of an abridgment of it published by Rotteck under the title of *Auszug aus der Weltgeschichte* (4 vols. 8vo., 1831), have appeared, including one of the latter by T. Jones (4 vols. 8vo., Philadelphia, 2d ed., 1840-'42), which was reprinted in London. Among his remaining works are: *Kleinere Schriften* (5 vols. 8vo., 1829-'35), consisting of a variety of essays, letters, memoirs, &c.; *Lehrbuch des Vernunftrechts und der Staatswissenschaften* (4 vols. 8vo., 1829 *et seq.*); and *Staatsrecht der Constitutionellen Monarchie* (3 vols. 8vo., 1824 *et seq.*). Jointly with Welcker he edited the first 10 vols. of the *Staatslexikon* (Altona, 1834 *et seq.*).—His son, Dr. Hermann Rotteck, has edited his posthumous works in 5 vols. 8vo. (Freiburg, 1841-'3), the 4th of which contains a memoir of him.

ROTTEN STONE, a decomposed stony substance resembling tripoli, and used for polishing metallic surfaces, glass, &c. A specimen analyzed by R. Phillips consisted of alumina 86, carbon 10, and silica 4. It is obtained in a ridge at Bakewell, Derbyshire, England, and is thence exported to different countries. It is found in loose fragments intermixed with clay and pieces of black marble and chert, which together make the diluvial covering of the ridge. The rotten stone is so soft that it is readily penetrated by the pick; but it becomes harder on exposure. It is dug out by sinking holes from 2 to 8 feet deep. Prof. Johnstone, finding recently that some of the fragments had a nucleus of black marble, treated specimens of this rock with weak acid, the effect of which was to dissolve away the carbonate of lime and leave a residue like the rotten stone, and containing from 15 to 20 per cent. of silica. The black marble in its natural bed being nowhere found converted into rotten stone, it is

supposed that there is some acid, probably of organic nature, existing in the soil, which decomposes the marble and converts the fragments into this rotten material.

ROTTERDAM, a city of Holland, capital of the province of South Holland, situated on the right bank of the Meuse at the junction of the Rotte, 36 m. S. W. from Amsterdam, and 24 m. from the sea; pop. in 1859, 105,984. It is built in the form of a triangle, with two sides next the rivers, and the third side is defended by old fortifications, outside of which are extensive suburbs. A fine quay about 1½ m. long extends along the Meuse, shaded by a row of large elms planted in 1615. Several canals used as streets traverse the town, communication being maintained across them by many drawbridges and ferry boats. Some of these canals are so deep that vessels of the largest size come into the centre of the town and lie alongside the warehouses. Many of them are lined with trees. The tide rises 10 or 12 feet, and the ebb and flow keep the water from stagnating in the canals. The Hoogstraat, or High street, extends along the great dike or dam erected to prevent the overflowing of the Meuse, and the ground between it and the river, which is occupied by the most modern part of the town, has been gained since the dam was constructed. Rotterdam has a very quaint appearance, many of the houses having their gables turned toward the street. Of the numerous churches, the most deserving of notice is that of brick dedicated to St. Lawrence, and completed in 1472. The house where Erasmus was born is near this church, and is now used as a gin shop. His colossal statue of bronze stands on the great bridge called the Groote Markt. There is a botanic garden in the vicinity of the town. There are several breweries, 42 distilleries, 5 tanneries, 10 candle factories, 7 dye works, a shot factory, numerous bleach fields, and corn, oil, and saw mills. In 1856 227 vessels, of 58,768 tons, were built. The number of merchant ships and steamers belonging to the port in the same year was 2,372, tonnage 588,620. The number of vessels that entered with cargoes in 1855 was 2,112, tonnage 448,912; and the number that cleared in the same way was 1,602, tonnage 392,153. During the year ending Sept. 30, 1858, 35 vessels of 20,601 tons arrived and sailed with general cargoes under the flag of the United States.—Rotterdam was a place of importance and surrounded by walls in the 13th century; but its greatest prosperity was in the 17th and 18th centuries. It is now the second city in Holland.

ROUBILIAC, LOUIS FRANÇOIS, a French sculptor, born in Lyons about 1695, died in London, Jan. 11, 1762. He settled in England about 1720, and a monument designed by him for the duke of Argyle in Westminster abbey brought him into great repute. Among his monumental works, those of Bishop Hough in Worcester cathedral, and of Sir Peter Warren

and the Nightingale family in Westminster abbey, were the most highly esteemed. He also executed statues of George I. at Cambridge; of George II. in Golden square, London; of Shakespeare for Garrick, bequeathed by him to the British museum; of Handel, in Westminster abbey; and of Newton at Cambridge; beside a series of busts of eminent men for Trinity college, Cambridge, &c.

ROUEN (anc. *Rotomagus*), a city of France, capital of the department of Seine-Inférieure, situated on the Seine, 70 m. N. N. W. from Paris; pop. in 1856, 94,645. It stands on a gentle acclivity sloping toward the S., and is connected with its suburb St. Sever, on the opposite side of the river, by a suspension bridge and 2 stone bridges. Ramparts formerly extended round Rouen on the land side, and their site is now occupied by a series of boulevards bordered with rows of shade trees. The Place Royale near the centre of the town is the principal square; the others are all small, and that of La Pucelle contains a statue of the maid of Orleans, burned here by the English in 1431. The cathedral of Notre Dame, constructed chiefly in and between the 13th and 16th centuries, is 434 feet long and 103 feet broad, with transepts 174 feet in length, and the nave is 89½ feet high. The front is richly ornamented, and has 3 fine portals flanked by a lofty tower on each side. The central tower at the intersection of the nave and transept is surmounted by an iron spire 436 feet in height. The decorations are very elaborate and profuse. The interior is lighted by 130 windows. It contains a great number of tombs, including that of Richard I. (*Cœur de Lion*) of England, 2 dukes of Normandy, and 17 archbishops of Rouen. Near the cathedral is the abbey church of St. Ouen, supposed to be one of the most perfect Gothic edifices in the world. It has a tower 260 feet high, composed of open arches and tracery and terminating in a crown of *fleurs de lis*. The houses in which Fontenelle and Pierre Corneille were born are standing. This city is the chief seat of French cotton manufacture. Ship building is also carried on, and vessels of 300 tons can ascend the river to the first stone bridge.—Rouen is a place of great antiquity, having been the capital of Gallia Lugdunensis Secunda under the Romans. In the 3d century it was made the see of a bishop, and afterward became successively the capital of the kingdom of Neustria, and of the duchy of Normandy till England was conquered by William I. In 1204 Philip Augustus of France besieged and took it from King John of England, but it was retaken by Henry V. in 1417, and retained by the English till 1449, when it was finally annexed to the French crown.

ROUGE, a cosmetic of pink color used for painting the cheeks in order to improve the complexion. Varieties are prepared from carmine and from the dried leaves of the safflower or carthamus. The latter furnish the delicate sort known as vegetable rouge. The leaves,

thoroughly washed, are dried, and then pulverized and digested in a weak solution of carbonate of soda. Into this is placed some finely carded cotton, and the alkaline mixture is neutralized with lemon juice or vinegar. The red coloring matter collects on the cotton, and this being washed with water in order to remove the yellow matter also present, the rouge is again dissolved, and some finely pulverized talc is introduced into the solution before it is again precipitated with the acid. Upon this the red color is received, and when separated from the liquid the two are thoroughly mixed by trituration, a little olive oil being rubbed in to add to the smoothness of the mixture. Sometimes woollen threads are placed in the second solution to receive the rouge, when it is precipitated, and these, called *crepons*, are used to rub the color upon the cheeks. For further accounts of this coloring material, see CARMINE, CARTHAMUS, and COCHINEAL.—Rouge, in the arts, is a pigment known as English red, and also a polishing powder, composed of peroxide of iron, prepared with great care by manufacturing chemists, some of whom in Liverpool are exclusively devoted to this branch. To prepare it, crystals of sulphate of iron (copperas), fresh from the crystallizing vessels to insure their cleanliness, are placed in iron pots and heated, every precaution being taken to protect them from dust. By this calcination the sulphuric acid is expelled and oxide of iron remains. Those portions which are obtained of a scarlet color, and least calcined, make when ground rouge for polishing gold and silver. Those of red, purple, or bluish purple shades make the powder known as crocus, which is used for polishing brass or steel. As the perfection of the specula of telescopes depends upon the fineness and efficiency of the rouge used for polishing them, the preparation of this article has received much attention from scientific men, and various processes are employed for insuring its greatest purity. Lord Rosse gives the following as his method. The peroxide of iron is precipitated by ammonia from a pure dilute solution of sulphate of iron, and the precipitate after being washed is compressed under a screw press until nearly dry, and then exposed to a heat which in the dark appears only of a dull low red. The color thus obtained should be a bright crimson inclining to yellow. If potash or soda be used instead of ammonia to precipitate the oxide of iron, a trace of the alkali always remains, injuring the polishing property of the rouge. Dr. Ure recommends precipitating the oxide as a protoxalate from a solution of a protosalt of iron (as the sulphate) by means of oxalate of potash. The precipitate, being well washed and dried, is gradually heated on an iron plate until the oxalic acid is driven off and peroxide or rouge remains. Though not very bright in color, the rouge is very fine, and will not scratch the most delicate article. Rouge is also made by pulverizing the purest hematites and specular

iron ores. The variety thus obtained rather resembles the crocus, and is particularly well adapted for coating razor strops, &c. The rouge known as artificial specular iron ore, and also very useful for applying to razor strops, is made by rubbing together in a mortar equal parts of well dried sulphate of iron and common salt, then gradually bringing the mixture to a red heat in a shallow crucible. Vapors escape, and the mass fuses and becomes violet brown, coated with brilliant scales like specular iron ore. It is treated with water to dissolve and remove the sulphate of soda, and the oxide of iron remains behind.

ROUGE ET NOIR (Fr., red and black), or TRENTE-UN (thirty-one), a game of chance played with cards upon a table marked with two large spots of red and black (whence the name), of a diamond shape, placed opposite to each other. The banker, or *tailleur* (dealer), who represents him, having shuffled 6 packs of cards together, draws as many cards as will, counted by their points (the court cards counting 10 each, and the others according to their number of spots), amount to at least 31; so that if he should happen to count only 30, he must still draw another card. These he places in one row or parcel, and designates as *noir*; and he immediately afterward draws in the same manner another parcel of cards for the *rouge*. The players, who play against the *tailleur*, and whose number may be unlimited, have previously placed their stakes on the red or black spots upon the table, and as the *rouge* or the *noir* parcel of cards amounts to 31 or approaches nearest to it, they win or lose; i. e., if the *rouge* counts for example 32 and the *noir* 33 or more, the money placed upon the red wins. When the *tailleur* deals to the second or *rouge* parcel of cards the same number he has turned up in the *noir*, it is called a *refait*, and another deal must be had. There are two other chances, called *couleur* and *interse*, which are determined by the color of the first card turned up and the success of *rouge* or *noir*; those playing on the *couleur* winning if the first card dealt is of the successful color, and those on the *interse* if the contrary. The game is principally played on the continent of Europe, and particularly at Spa, Baden-Baden, Ems, and other fashionable watering places.

ROUMELIA, RUMELIA, or ROMANIA (Turk. *Rum-ili*, Roman land), the name formerly applied by the Turks to the largest of their European provinces, comprising their most important possessions in Greece and N. of it as far as the northern ridges of the Balkan, and now applied by them to a territory comprising parts of Macedonia and some adjoining districts to the N. W. (capital, Bitolia or Toli Monastir). By occidental writers, however, the name is generally used to designate the provinces known to the ancients as Macedonia and Thrace, and in a more limited sense Thrace alone. In this limited sense Roumelia is bounded N. by the Balkan, E. by the Black sea, S. E. and S. by

the Bosphorus, the sea of Marmora, and the Grecian archipelago, and W. by the Despoto-dagh ridge and Karasu river; it is watered by the Maritza and its affluents the Tundja and Erkenek, and contains among others the cities of Constantinople, Adrianople, Filibeh or Philippopoli, Eski Sagra, Kirkilisseh, Visa, Burgas, Demotica, Rodosto, Gallipoli, and Enos. It is the principal seat in Europe of the Mohammedan population of Turkey. (See THRACE.)

ROUPHIA, a river of Greece. See ALPHETS.

ROUQUETTE, ADRIAN, an American poet, born in New Orleans about 1808. He was educated at the royal college of Nantes, France, and studied law, but abandoned it for the church, and became a professor in the Roman Catholic seminary at New Orleans. He writes both in French and English, and his works comprise *Les savanes, poésies Américaines* (Paris and New Orleans, 1841); "Wild Flowers," a volume of sacred poetry (1848); a prose treatise in defence of monasticism entitled *La Thébaine en Amérique, ou apologie de la vie solitaire et contemplative* (1852), &c.—FRANÇOIS DOMINIQUE, brother of the preceding, born in New Orleans, Jan. 2, 1810, was also educated at Nantes, studied law in the office of William Rawle in Philadelphia, and returning to France published there a volume of poems entitled *Les Meschacébéennes*. He has written a work, both in French and English, on the Choctaw nation.

ROUSSEAU, JEAN BAPTISTE, a French lyric poet, born in Paris, April 6, 1670, died in Brussels, May 15, 1741. Though the son of a shoemaker, he was well educated, secured the favor of Boileau, and was introduced to the most elegant, if not the most respectable circles of French society, where his wit, lively sarcasm, and easy poetical effusions made him a favorite. When about 20 or 22 years old, he went to London as private secretary of Marshal Tallard, and on his return home devoted himself to literature. His first comedy, *Le café* (1694), had but indifferent success. *Le flatteur* (1696), a 5-act play in verse, had a better fortune; but when his father came into the green-room to congratulate him, he contemptuously turned away, saying: "I do not know that man." Two operas, *Jason, ou la toison d'or* (1696), and *Vénus et Adonis* (1697), were coldly received; and his dramatic career closed in 1700 with *Le capricieux*, a decided failure. He now wrote virulent satires in the shape of songs, which were very popular, and afterward attempted to give imitations of the psalms, which were greatly admired. His "Sacred Odes" are incontrovertibly his best performances; but licentious poems and worldly epigrams also flowed from the pen which seemed to be engaged in the service of God. Becoming involved in suits for slander, he was sentenced to perpetual banishment, April 7, 1712, and took refuge in Switzerland, where he published a revised edition of his works, including only such as were unobjectionable in point of morals and religion. In 1715 he went

to Vienna, and made the acquaintance of Prince Eugene. Some of Rousseau's friends in France were true to him, and in 1716 "letters of recall" were issued for him; but he insisted upon the cancelling of the sentence against him, and refused to return to France. He finally settled in Brussels, where he managed to rouse the anger of Voltaire. In 1738 he visited Paris for a few weeks under an assumed name. His last years were embittered by bodily sufferings. The editions of his poems are numerous. His complete works were published by Amar (5 vols. 8vo., Paris, 1820). The last edition of his *Œuvres lyriques* is that of Manuel (12mo., Paris, 1852), with annotations.

ROUSSEAU, JEAN JACQUES, a French philosopher and author, born in Geneva, June 28, 1712, died at Ermenonville, near Chantilly, July 8, 1778. The son of a watchmaker of erratic habits, and his birth having cost his mother her life, he was brought up by one of his paternal aunts, attended for a little while a school where he learned scarcely anything, and derived all his notions of the world from reading Plutarch's "Lives" and Richardson's novels. Becoming a clerk to a municipal officer, he soon proved incompetent for his duties, and was apprenticed to an engraver; but being ill treated by his master, he ran away, and when scarcely 15 wandered through Savoy. At Annecy he met Madame de Warens, who took pity on him and received him into her house. Herself a recent convert to the Roman Catholic faith, she procured his admission into the hospital or college of the catechumens at Turin, where at the end of a few months he became tired of the seclusion to which he was subjected, and, chiefly in order to regain his freedom, formally renounced the Calvinism in which he had been reared and became a Roman Catholic. Leaving the hospital with scarcely any pecuniary means, he was compelled to engage as a servant to the countess de Verceilis, and then to M. de Gouvion, first equerry to the queen of Sardinia. By the advice of a wandering musician with whom he became acquainted, he afterward presented himself at Lausanne as a music teacher, although he had scarcely any notion of the art. He made but a scanty living by it, and was more than once at his wit's end. During this period he occasionally visited his patroness, Mme. de Warens, by whom he was always welcomed either at Chambéry, whither she had removed, or at her country seat, Les Charmettes. In 1732 he repaired to Paris in order to try his fortune there; but notwithstanding the letters of introduction he brought with him, he could not find a situation. On his return Mme. de Warens received him again into her household, and the most intimate relations were established between them. Here for more than 8 years he had leisure to make up, partly at least, for the deficiencies of his former education. He read Virgil and Descartes, Racine and Newton, Fénelon and the learned Father Lamy. Man and his



destinies were also the special subject of his meditations. A severe illness that preyed upon him when he was 24 years old also contributed to give a more serious direction to his thoughts. In 1740, ashamed of his indolent mode of life, and hurt by the preference Mme. de Warens evinced for another man, he determined to leave his peaceful retreat, and through her influence obtained a situation as instructor in the family of M. de Mably, the grand provost of Lyons. There he remained a year, after which, bidding a last farewell to Mme. de Warens, he started for Paris again. He had invented a new system of musical notation, by which he expected to make a fortune in the French metropolis; but he finally thought himself fortunate to become private secretary to M. de Montaigu, the French ambassador to Venice, whom he accompanied to Italy. After many quarrels they separated in a rage, and Rousseau returned to Paris. He was now introduced to M. Dupin de Francueil, a celebrated financier, at whose house he met many of the literary characters of the time, and became intimate with Diderot and Grimm. He tried in vain to bring out *Les muses galantes*, a light opera, of which both words and music were his. In 1745 the duke de Richelieu intrusted him with revising *La reine de Nature*, an opera by Voltaire and Rameau; but he received no compensation for it. Neither a lively comedy, *Narcisse*, which he presented at the Italian theatre, nor articles which he wrote for the *Encyclopédie du 18<sup>e</sup> siècle*, were paid for, and he was reduced to becoming secretary to M. and Mme. Dupin, each of whom was preparing to write a book, at a salary of 800 or 900 livres a year. He now began to live in intimate relations with Thérèse Levasseur, an uninteresting girl, whom he had known some years previous, when she was a servant at a fourth-rate hotel in one of the lowest districts of Paris. Meanwhile he was introduced by his employer to Mme. d'Épinay, and participated in the amusements at that lady's house, and especially at her country seat of La Chevrette, near St. Denis. He wrote for her a light comedy, *L'engagement téméraire*, which was, as a contemporary said, "the work of a man of wit and a strange man," and in which he himself performed. He was however still unknown as a writer, when in 1749 the academy of Dijon offered a prize for the best essay on the question: "Whether the progress of science and the arts has contributed to corrupt or improve the morals of mankind?" He eagerly caught at the subject, and, taking the first alternative, wrote a discourse in which he assailed civilization in a strain of impassioned eloquence. This discourse gained the prize and created an unheard of sensation among the reading public; its author was at once ranked among the great writers of the age. He now became a lion, and, though awkward in his manners, was welcomed in society. He mingled freely in the world, contenting himself with playing the part

of "censor of civilization," and everywhere assailing literature and art, under the pretence of bringing back mankind to simplicity and virtue. In accordance with his principles, he rejected fine linen and silk clothing, and adopted coarser garments; moreover, to procure a living independent of his literary work, he announced himself as a copyist of music, and customers flocked to his humble rooms. Among the essays he now wrote, the *Discours sur l'économie politique*, which appeared in the *Encyclopédie*, is a strange mixture of conservative principles and revolutionary sentiments. In 1752 he produced his  *Devin du village*, an opera, whose artless melody won general admiration. It was immediately performed at court, and gave a new impetus to the quarrel then going on between the supporters of Italian and French music. Grimm had already published two witty pamphlets in behalf of the former, when Rousseau came out in his *Lettre sur la musique Française*, which shook the musical and literary world to its foundations, and so much wounded the national vanity, that he was on the eve of being exiled from France. In 1753 appeared his *Discours sur l'origine de l'inégalité parmi les hommes*, sent to the academy of Dijon, and not rewarded with a prize on account of its vehement attacks on despotism, but eagerly sought by the reading public. Being now a celebrated man, he paid a short visit to his native town, which he had left as a vagrant. He was honorably received there, and in order to regain his rights as a citizen he again embraced Calvinism. Henceforth he added to his name the title of "citizen of Geneva." In 1756 he became involved in bickerings with Voltaire; and because the latter, who was then living at his country seat of Les Délices, exercised considerable influence in Geneva, Rousseau gave up all idea of returning there. He now went to live in a cottage built for him by his friend Mme. d'Épinay in the valley of Montmorency, and since celebrated under the name of L'Ermitage. Here he spent 19 months, chiefly in writing a novel, *Julie, ou la nouvelle Héloïse*, in which he more than once gave utterance to a passion for Mme. d'Épinay's sister-in-law, Mme. d'Houdetot, who was on intimate terms with St. Lambert. This and some other private matters gave rise to unpleasant reports, suspicions, and discontents, which were embittered on one side by Thérèse, his mistress, and on the other by Grimm, his former friend, who had secretly become his enemy. In Dec. 1757, he abruptly left his cottage, and, without taking notice of the reports circulated against him, repaired to a small house which he had rented at Mont Louis, near Montmorency. About the same time he broke with Diderot, whom he charged with treachery, and misanthropy became a fixed disease of his mind. This seemed, however, but to give a new impulse to his genius; in his new abode he completed *La nouvelle Héloïse*, which appeared in 1759, and then wrote in succession his *Lettre*

*sur les spectacles*, or rather "Letter against the Theatre," which he addressed to D'Alembert; *Le contrat social, ou principes du droit politique*; and *Émile, ou de l'éducation*. Meanwhile new friends came to him in his solitude. The duke and duchess of Luxembourg, who were residing at the castle of Montmorency, endeavored to soften his growing hatred of mankind; they even succeeded in bringing him to their chateau, where he was introduced to the acquaintance of the prince of Conti, the countess of Boufflers, and M. de Malesherbes, then the censor of the press in France. They all cordially interested themselves in his welfare; and when *Émile* was ready for the press, it was printed at the expense of the duke of Luxembourg, under the personal supervision of Malesherbes. But this work brought a terrible storm upon its author; the parliament of Paris, seizing upon some objectionable speculations on religion and morality, declared the book to be impious and blasphemous, decreed that it should be torn and burned within the precincts of the court house, and ordered the arrest of its author. Rousseau was willing to surrender himself to appear before the parliament; but yielding to the entreaties of his friends, he fled for safety, thus beginning the unsettled life in which he continued to the end. Geneva, instead of offering him an asylum, followed the example of the French parliament; *Émile* was condemned, and Rousseau expelled from the territory of the republic. He in disgust dropped his title of citizen, and took refuge in the canton of Neuchâtel, which then belonged to the king of Prussia, and had Lord Keith as its governor. The Scottish exile felt strong sympathy for the proscribed writer, forced him to accept the grant of a small pension, and permitted him to settle at Motiers-Travers. Here Rousseau hoped to find quiet and seclusion; but his opponents were still active. A severe censure which the archbishop of Paris passed upon *Émile* drew from him an eloquent reply in his *Lettre à M. de Beaumont*; while in his *Lettres de la montagne* (1764) he answered the charges brought against him in Geneva, and bitterly denounced the aristocracy of that city. Many of the Calvinist ministers now violently assailed him, and the pastor of Motiers-Travers incited his parishioners to turn him out of their village. The unfortunate refugee, bereft of the protection of Lord Keith, who had returned to Prussia, was obliged to fly before the threats and violence to which he was daily exposed. He went to the island of St. Pierre in the lake of Bienne; but an order from the senate of Bern prevented him from settling there. He started for Berlin, where he was sure to find the patronage of Lord Keith; but on his arrival at Strasbourg he was enthusiastically received, and yielding to the advice of his friends he accepted the invitation of David Hume, who offered him a safe asylum in England. After passing unmolested through

France and spending a few days in the hospitable house of the prince of Conti at Paris, he reached London in Jan. 1766, and a few weeks later went to Mr. Davenport's in Staffordshire, where a private residence had been provided for him. Hume was about procuring a pension from the king, and every thing seemed to forebode a happy future. But soon suspicions arose in the diseased mind of Rousseau; his new patron did not perhaps evince the needed forbearance; angry letters were exchanged; and Rousseau henceforth looked on Hume as a willing tool in the hands of the enemies who were conspiring against his honor and even his life. In a fit of passion he left Mr. Davenport's house, stopped for a while at Wotton, then for several days wandered about England, writing insane letters to the ministers, and finally reached Dover, whence he sailed in haste for France. From Calais he went to Amiens, where he exchanged civilities with Gresset, the poet; then to Fleury, the country seat of the marquis of Mirabeau, father of the great orator; then to Trie, where the prince of Conti urged him to remain. Nowhere could he be persuaded to stop; everywhere he imagined himself surrounded by plotting enemies. He at last repaired to Bourgoins, a small town in Dauphiné; and there in the presence of two witnesses he took formally as his "wife" the woman with whom he had been living for years. With plans for the future ever changing, he now began to write the autobiography so celebrated under the title of "Confessions," which he intended to be a triumphant vindication of his own career. Full of this idea, he returned to Paris, where, although the sentence of the parliament was still in force against him, he was allowed to settle quietly. In pursuance of his design, he went into society and frequently read there parts of his "Confessions," which made such a sensation that Mme. d'Épinay procured an order from the police for the suppression of the readings. This last blow weighed heavily on him; his misanthropy became more gloomy than ever, occasionally urging him to acts bordering on insanity. His latter years were however marked by works which prove that his mental powers were unimpaired, such as his *Considérations* upon the government of Poland, and the *Promenades du rêveur solitaire*. Six weeks previous to his death he had consented to repair to the country seat of M. de Girardin at Ermenonville. The beauty of the surrounding country, the kindness of his entertainers, and the cheerfulness of their children, had a refreshing influence on his mind, and he seemed to be reviving when, 34 days after Voltaire's death, an apoplectic stroke, it is believed, carried him away. Rumors of suicide were freely circulated on this unexpected termination of so troubled a life; but there is no positive evidence to substantiate the charge. He was buried in the island of Poplars, within the limits of M. de Girardin's estate. During the revolution the constituent

assembly decided by a nearly unanimous vote that a statue should be erected in honor of Rousseau; and his remains were afterward transported to the Pantheon. In 1815 the place consecrated by his grave was respected by the invading armies of Europe. The most valuable edition of his works is that of Musset-Pathay (23 vols. 8vo., Paris, 1823-'6), including a history of his life and works by the editor. Others have been published by Villenave and Depping (8 vols. 8vo., 1817), Petitain (22 vols. 8vo., 1819-'20), Auguis (25 vols. 8vo., 1825 *et seq.*), and more recently in Didot's *Chefs d'œuvre de la littérature Française* (4 vols. large 8vo.). Among the numerous biographical and critical essays upon Rousseau, may be mentioned the able papers published in the *Revue des deux mondes* (1852-'6) by St. Marc Girardin, under the title, *Rousseau, sa vie et ses ouvrages*.

ROUSSILLON. See PYRÉNÉES-ORIENTALES.

ROUSSY, GIRODET DE. See GIRODET-TRIOSON.

ROWAN, a W. co. of N. C., bordered partly on the E. by the Yadkin, and N. E. by the South Yadkin; area, about 600 sq. m.; pop. in 1860, 14,586, of whom 3,929 were slaves. It has an uneven surface and a generally fertile soil. The productions in 1850 were 86,613 bushels of wheat, 540,637 of Indian corn, 141,482 of oats, and 854 bales of cotton. There were 28 grist mills, 25 saw mills, 1 cotton and 1 woollen factory, 7 tanneries, 32 churches, and 2,362 pupils attending schools. Capital, Salisbury.

ROWE, ELIZABETH, an English authoress, born in Ilchester in 1674, died in 1737. She was the daughter of a dissenting minister named Singer. In 1709 she was married to Thomas Rowe, the author of a supplement to Plutarch's "Lives," who died in 1715. Her works comprise "Poems on Several Occasions, by Philomela" (1696); "Friendship in Death, or Twenty Letters from the Dead to the Living" (1728); "Letters, Moral and Entertaining, in Prose and Verse" (1729-'31); "Joseph, a Poem" (1736); and "Devout Exercises of the Heart," published after her death by Dr. Isaac Watts. Her "Miscellaneous Works, in Prose and Verse," were published in 1739 (2 vols. 8vo.). Her "Letters from the Dead" and "Devout Exercises" are still reprinted.

ROWE, NICHOLAS, an English dramatist, born at Little Barford, Bedfordshire, about 1673, died Dec. 6, 1718. He was educated under Dr. Busby at Westminster, and studied law, but turned his attention to belles-lettres, especially to poetry. When 25 years old he composed a successful tragedy called "The Ambitious Stepmother." In 1702 appeared his tragedy of "Tamerlane," upon which, according to Dr. Johnson, he valued himself most. In 1703 he brought out "The Fair Penitent," founded upon "The Fatal Dowry" of Massinger, and in 1706 the comedy of "The Biter," which was a signal failure. Between this time and his death

he successively produced the tragedies "Ulysses," "The Royal Convert," "Jane Shore" (a professed but not very successful imitation of Shakespeare), and "Lady Jane Grey." He also translated the *Pharsalia* of Lucan, generally considered the best of his productions. In 1709 he published an edition of Shakespeare (7 vols. 8vo.), with the first biography of the poet. In the reign of Queen Anne, Rowe was under secretary of state for a short time. On the accession of George I. he was created laureate, Aug. 1, 1715, and received an office in the customs. He was buried in Westminster abbey, and for the monument which his widow raised to his memory Pope wrote an epitaph.

ROWLEY, WILLIAM, an English dramatist of the age of Elizabeth, who lived through the reign of James I., and died in that of Charles I. He was educated at Cambridge, belonged to the royal company of players, excelled in comedy, and was on terms of close intimacy with all the poets and wits of his time, many of whom he assisted in the preparation of plays for the stage, and from some of whom he himself received a helping hand. Thus, "A Fair Quarrel" is by T. Middleton and W. Rowley; "The Witch of Edmonton" is by Rowley, Decker, and Ford; "The Old Law" is by Massinger, Middleton, and Rowley; "Fortune by Land and Sea" is by Heywood and Rowley; and it is stated that in his own play entitled "The Birth of Merlin," Rowley received some assistance from Shakespeare. Lamb speaks of Rowley, in comparison with Massinger, as the finer genius of the two, and lauds his "exquisiteness of moral sensibility."

ROXBURGHSHIRE, a border county of Scotland, bounded N. by Berwickshire, E. and S. by the N. counties of England, and S. W. and W. by Dumfries and Selkirk; area, 696 sq. m.; pop. in 1851, 51,642. Jedburgh, Kelso, Hawick, and Melrose are the chief towns. The principal rivers are the Tweed and Teviot. The Cheviot hills extend from the E. extremity of the county to the S. W., and afford excellent pasturage. In 1856, 126,118 acres were under crop, and there were about 450,000 sheep in the county. Some of the farms are 3,000 acres in extent, and 1,000 acres is not an uncommon size. Woollen manufactures are carried on. Roxburghshire is very rich in remains of monastic magnificence. In the days of border warfare it was the scene of many a bloody fight, and Scott has made many of its traditions familiar to the world.

ROXBURY, a city of Norfolk co., Mass., about 2½ m. from Boston, with which it is connected by horse railroads plying over Boston Neck; pop. in 1860, 25,137. It has a very diversified surface, presenting within narrow limits a remarkable alternation of hills and hollows. These characteristics afford a great variety of scenery and rare opportunity for picturesque building sites, advantages of which the wealthy citizens of Boston have largely availed themselves; and it is not only a favorite place

for their residences, but much resorted to as a drive. Forest Hills cemetery, belonging to the city, but within the limits of the new town of West Roxbury, is a very beautiful burial place of 100 acres. In 1855 Roxbury had 28 forges, 4 steam engine and boiler manufactories, and others for cotton and woollen machinery, starch, paints, glue, lead, &c. There are also 3 cordage factories, a carpet factory, a manufactory of goods from flax cotton, and an organ factory. It has 2 banks, a savings bank, 2 weekly newspapers, and 11 churches, viz.: 2 Baptist, 4 Congregational, 1 Episcopal, 2 Methodist, 1 Roman Catholic, and 1 Universalist. Beside an English high school, 4 grammar and 86 primary schools, it has a free Latin school supported by funds in the hands of trustees. This institution was founded in 1645, and will be 50 years hence one of the wealthiest of the kind in New England. A history of the school has recently been published. Roxbury is the birthplace of Joseph Warren, so distinguished in our revolutionary history. It was for many years the scene of the labors of John Eliot, the apostle to the Indians, whose remains are in the "ministers' tomb" in the old burial ground. The township of West Roxbury, containing the villages of West Roxbury and Jamaica Plain, was set off in 1852.

**ROXOLANI**, or **RHOXOLANI**. See **SARMA-TIA**.

**ROY, RAMMOHUN**. See **RAMMOHUN ROY**.

**ROY, WILLIAM**, a British geodesist, died in London, July 1, 1790. After the suppression of the rebellion of 1745, Roy, then colonel, was intrusted with the exploration and mapping out of the Scottish highlands, for the purpose of establishing military posts, but this work was stopped by the opening of the war of 1755. After the peace of 1763 a series of trigonometrical measurements were undertaken for the purpose of determining the exact differences between the latitudes and longitudes of Paris and Greenwich, and the superintendence of that portion of the work between Greenwich and Dover was placed in the hands of Gen. Roy. This work, completed in 1788, was the first of the ordnance trigonometrical surveys carried on over the United Kingdom. On account of his health he was obliged to spend the winter of 1789-'90 in Lisbon, but died shortly after his return, before his paper in the "Philosophical Transactions" on this work had been finished. At the time of his death he was deputy quartermaster-general, colonel of the 30th regiment of infantry, and surveyor-general of the coast. After his death the London society of antiquaries published in 1798 a work of his on the Roman camps of Scotland, under the title of "The Military Antiquities of the Romans in North Britain."

**ROYER-COLLARD, PIERRE PAUL**, a French statesman and philosopher, born in Sommepeux, Champagne, June 23, 1763, died in Châteauneuf, Loire-et-Cher, Sept. 4, 1845. He was educated at Chaumont and at St. Omer, de-

voted himself to legal studies in Paris, and at the age of 20 became a member of the bar of that city. At the outbreak of the revolution he attached himself at first to the party of Danton, represented after the taking of the Bastille the Isle of Paris in the first organized municipality, and was secretary to the council of the commune under the mayoralties of Bailly and Pétion, but after Aug. 10, 1792, was proscribed as a moderate. He took refuge in Sommepeux, narrowly escaped the search of the committee of public safety, and, despairing of the establishment of a republic, engaged in correspondence with the royalist council in Paris. In 1797 he was elected to the council of 500 by the department of Marne, which he afterward represented in the chamber of deputies during the restoration and the reign of Louis Philippe. He was the medium of the overtures which twice passed between the first consul and the count of Provence, each suggesting the abdication of the other with compensatory honors; and after the establishment of the empire he renounced politics and lived in seclusion, till in 1811 he was appointed professor of the history of philosophy in the Sorbonne. His lectures were interrupted by the approach of the allied armies to Paris in March, 1814, and were never resumed; and there have been preserved only two of them complete, with a few fragments. After the second restoration he entered the chamber of deputies, and was appointed president of the committee of public instruction. As a liberal royalist, and the acknowledged founder and chief of the party of the *doctrinaires*, he for a time supported the ministry of Decazes. The most eloquent of his discourses was delivered in 1825 against the proposed law of sacrilege, which would have required of every citizen a profession of the Roman Catholic faith. In 1827 he was chosen by 7 electoral colleges at once to the chamber, of which he was appointed president in 1828. About the same time he succeeded Laplace in the French academy. He withdrew finally into privacy after the retirement of the Molé administration in 1839. The master of Cousin and Jouffroy in speculative philosophy, and of Guizot and De Tocqueville in political science, he has left no permanent record of himself at all corresponding to his personal reputation and authority. His philosophical writings, chiefly fragmentary, in an original and picturesque style, are published with Jouffroy's translation of the works of Reid.

**RUATAN**. See **BAY ISLANDS**.

**RUBENS, PETER PAUL**, a Flemish painter, born in Siegen, Westphalia, June 29, 1577, died in Antwerp, May 30, 1640. His birthday occurring on the festival of St. Peter and St. Paul, he was named after those apostles. His parents, who had been driven by the religious and political troubles of the Low Countries into a temporary exile, established themselves soon after his birth in Cologne, where Rubens resided until the age of 10. He then

accompanied his mother to Antwerp, and in his 13th year was placed with Van Hæght, a landscape painter. Subsequently, after spending some time with Van Oort, he completed his art education in the studio of Otto van Veen, by whose advice he repaired in 1600 to Italy, furnished with letters of recommendation from the archduke Albert, then viceroy of the Netherlands, and his consort, the infanta Isabella. Of unusual promise in his art, he was also well informed in many branches of polite learning, of handsome person, dignified bearing, and accomplished manners. Making Venice his first halting place, "he compounded," says Fuseli, "from the splendor of Paul Veronese and the glow of Tintoretto that florid system of mannered magnificence which is the element of his art and the principle of his school." At this time he became known to Vincenzo di Gonzaga, the duke of Mantua, by whom he was appointed gentleman of the chamber and court painter, and who in 1605 sent him on a diplomatic mission to Philip III. of Spain. He was received with great favor at the Spanish court, where he painted portraits of the king and the principal grandees, beside many historical pieces, and after returning to Italy resided successively in Rome, Milan, and Genoa. In Genoa he made a collection of drawings of the chief edifices, which was subsequently engraved and published (2 vols. fol., 1622). The serious illness of his mother in 1608 hurried him back to Antwerp, where the archduke Albert gave him a gracious reception, and, as an inducement to remain in Flanders, appointed him court painter, with the privilege of residing in Antwerp. Settling in that city, he married in 1609 his first wife, Elizabeth Brants, and for many years was prosperously engaged in his profession. His pictures painted at this period are considered, both in composition and finish, his most pleasing productions; and notwithstanding the rapidly increasing demand for them, it is probable that the greater part were executed wholly by himself. In his later works he was aided by a numerous band of pupils. He lived in an elegant mansion in Antwerp, built by himself and stored with a choice collection of works of art, and his prestige as courtier and artist drew around him pupils from all parts of northern Europe. In 1620 he was commissioned by Maria de' Medici to decorate the gallery of the palace of the Luxembourg with a series of allegorical compositions illustrating the principal events in her career. The pictures, 21 in number, were in great part executed by his most eminent pupils from sketches prepared by him, which are now in the Pinakothek in Munich. While in Paris, superintending the details of this commission, Rubens made the acquaintance of the duke of Buckingham, to whom he disposed of his entire collection of works of art for the sum of 100,000 florins. In 1626 he was for a time rendered inconsolable by the death of his wife, to

whom he was tenderly attached, and whose portrait he frequently introduced into his works. In the following year he was sent by the infanta Isabella to the Hague to negotiate with Sir Balthazar Gerbier, the agent of Charles I. of England; and in the autumn of 1628 he revisited Spain in a diplomatic capacity, remaining there until April, 1629. During this visit he was appointed by Philip IV. secretary to the privy council, an office subsequently granted in reversion to his eldest son, Albert. Scarcely had he returned to Flanders, when he was despatched as envoy to the court of England. During his residence there, which terminated in Feb. 1630, he distinguished himself not less by diplomatic finesse than by assiduity in the practice of his art; and his allegory of "Peace and War," now in the British national gallery, with other works, was painted and presented by him to the king. The latter in return knighted him in Whitehall, presenting him at the same time with the royal sword and a massive gold chain. Returning to Antwerp loaded with distinctions, he was married, in Dec. 1630, to Helena Forman, a beautiful girl of 16. He now occupied, in point of fortune, rank, and public estimation, the most distinguished position probably ever attained by any artist; and so numerous were his commissions from crowned heads alone, that he had time for little more than designing and applying the finishing touches to the pictures which pass under his name, leaving the body of the work to be done by his pupils and assistants. In this manner were executed the series of pictures representing the apotheosis of James I. for the ceiling of the banqueting house of Whitehall, which were completed in 1635, and for which he received £3,000. In 1633 he was sent on another embassy to Holland, which was interrupted by the death of the infanta. This was his last public service, and a few years later he became in a great measure incapacitated for work by severe attacks of the gout, which frequently assailed his hands, rendering him unable to hold a brush, and which finally caused his death. His posthumous collection of works of art, including 819 pictures, is said to have produced £25,000. The pictures ascribed in whole or in part to Rubens amount, according to Smith's *catalogue raisonné*, to the enormous number of 1,800, or, estimating the number of years he was actually engaged in the practice of his art, to nearly one a week. Of the number painted entirely by him no certain estimate can be made, although, judging from his well known industry, his fertility of invention, and facility of execution, such pictures must be numerous. They comprise history, portraits, landscapes, animals, and fruit and flower pieces, and are widely dispersed over Europe, the collections at Antwerp, Munich, Vienna, Madrid, and the Louvre being particularly rich. The finest are still in Antwerp, in the cathedral of which city are his well known "Descent from the Cross"

and "Elevation of the Cross," the former being generally considered his masterpiece. In the academy at Antwerp are many of the pictures executed by Rubens in his earliest and best period, but a number of those formerly in the churches have been removed to other collections. The Belvedere in Vienna contains a noble altarpiece, with wings, representing the "Virgin presenting a splendid Robe to St. Ildefonso;" "St. Ambrose refusing to admit the Emperor Theodosius into the Church;" and two altarpieces representing the miracles performed by St. Ignatius Loyola and St. Francis Xavier. In the Pinakothek at Munich, which contains 94 of his works, are two illustrating the surprising energy which he infused into his delineations of human action, the "Battle of the Amazons" and the small picture of the "Fall of the Damned." Scarcely less powerful, though in a different degree, is the "Village Fête" in the Louvre. The British national gallery possesses the "Rape of the Sabines," which has been called "a perfect nosegay of color," the "Judgment of Paris," and several other works. Animal vigor, in the representation of which Rubens excelled, is seen nowhere with more effect than in his bacchanal feasts and mythological subjects of the coarser kind, of which "Castor and Pollux carrying off the Daughters of Leucippus," wonderful for its flesh coloring, and "Sleeping Wood Nymphs surprised by Satyrs," in the Pinakothek, are excellent examples. In his representations of the human figure he seldom attempted to idealize, and his Madonnas, Magdalens, and female saints are literally imitated from Flemish types of womanhood. As an animal painter he showed great excellence, and Sir Joshua Reynolds particularly commends his lions and horses, which, he observes, "perhaps never were properly represented but by him." His portraits are by some considered superior in their combinations of vigorous life with careful handling to any other of his productions. The *Chapeau de paille*, in the collection of Sir Robert Peel, and his numerous portraits of himself and his two wives, illustrate his skill in this department. Lastly in his landscapes he exhibited, says Kugler, "the same juiciness and freshness, the same full luxuriant life, the same vigor and enthusiasm as in his historical pictures." His life has been written by Waagen, Michel, Michiels, and others; and in 1859 a collection of papers from the British state paper office, illustrating his character as an artist and diplomatist, was published in London under the editorial supervision of W. Noel Sainsbury.

RUBICON, a small river of Italy, flowing into the Adriatic a little N. of Rimini (Ariminum), which in the time of the Roman republic was the boundary between Cisalpine Gaul and Italy. It has become historically famous from the story told of it in connection with Cæsar by Suetonius and Plutarch, although no mention is made of the event by that leader in his "Commentaries." As the passage of the

stream would be marching beyond the bounds of his province, and therefore a virtual declaration of war, it is said that Cæsar, as he reached its brink, hesitated for a moment, then plunged in, exclaiming: *Jacta est alea* ("The die is cast"). There has been considerable controversy as to the identification of this stream, the contest being between the rivers Lusa and Fiumicino, the latter formed by 3 small streams, the most important of which is the Pisatello. The former is the larger and more southern, and in 1756 was pronounced to be the stream by a papal bull, and in consequence has been called the Rubicon. Modern geographers, however, decidedly favor the Fiumicino, although the subject is not yet entirely cleared up.

RUBINI, GIOVANNI BATTISTA, an Italian singer, born in Romano, Bergamo, in 1795, died there, March 2, 1854. His father, a teacher of music, placed him while a boy with an organist near Brescia, who speedily reported that his pupil had no talent for singing. Young Rubini however persevered in his studies, and after an obscure career of several years in Lombardy, as a member of a strolling theatrical company, made his debut at Brescia in 1815 with great success. For several years his fame was confined to Italy, and his emoluments were moderate; but after his appearance at the Italian opera house in Paris in 1825 as Ramiro in Rossini's *Cenerentola*, he rose to the first place in his profession as a tenor singer, and his annual earnings were enormous. From 1831 to 1846 he sang principally at the opera houses of London, Paris, and St. Petersburg, and in the latter year retired with a large fortune to a villa near Bergamo, where he passed the remainder of his life. His voice, a tenor of remarkable sweetness, extended from E to F above the staff—a compass of two octaves and one note—and has been known to reach as high as G above the staff. He excelled in the music of Bellini, and was almost unrivalled in the expression of sorrow and tenderness. He was an indifferent actor.

RUBLE, a Russian silver coin and unit of account. Down to the beginning of the 15th century value was counted in Russia by peltries; but about that time the Russians began to use silver in bars, and from a bar of silver to strike off sufficient weight for a payment. This act of cutting or striking off the piece of silver was called *rubat*, whence the word ruble. The ruble, in account, is divided into 100 copecks or 10 grievens. Rubles from the time of Peter the Great to Alexander (1805), assayed at the mint in London, varied in value between 73 and 83 cents, the older coins being the heaviest. The U. S. mint value of the silver ruble of 1837-'8 is 75.4 cents. Gold is coined in 5 or more rubles; fractions of the ruble are in silver. There are also paper or bank rubles valued at about  $\frac{1}{4}$  of the silver coin.

RUBRIO (Lat. *ruber*, red), an ecclesiastical term denoting the rules and orders which direct how, when, and where all things in di-

vine service are to be performed. They were formerly printed in red characters, and hence their name. The clergy of the Roman Catholic church, the church of England, and the Protestant Episcopal church of America bind themselves to observe the rubrics. Writers who comment on the rubrics of the liturgical books are called rubricists. The most celebrated of this class of writers was Gavanti, whose *Theaurus Sacrarum Rituum* (4 vols., Rome, 1786-8) is still regarded in the Roman Catholic church as the standard work on the subject.

**RUBRUQUIS, WILLIAM DE**, a Franciscan monk, born in Brabant about 1230. His real name was Ruysbroek or Rysbruck, which, according to the fashion of the scholars of his age, he Latinized into Rubruquis. After having taken the major vows, he went with other Franciscan missionaries to the Holy Land, and in 1253 was sent out by Louis IX. of France in quest of that mysterious Christian potentate of central Asia, Prester John. The mission consisted, beside himself, of two other friars of the Franciscan order. He penetrated into Tartary, visited Batu Khan, and later Mangoo Khan, the great Tartar emperor, in whose presence he received permission to dispute with imams and with Nestorian priests, but without result. He was altogether about 2 years and 6 months on his laborious travels, and reached Tripoli, Syria, in Aug. 1255. He wished to go to France and communicate personally to the king the results of his interesting journey; but by order of his provincial, he had to remain in the cloister of Acre, from whence he transmitted his manuscript to Paris. An English translation of this remarkable account is given in the collection of Hakluyt (vol. i.) and in that of Purchas, and a French one by Bergeron (Paris, 1629). Nothing is known of his later life, except that he was still living in 1293 when Marco Polo was returning from the East.

**RUBY.** See **SAPPHIRE**.

**RÜCKERT, FRIEDRICH**, a German poet and orientalist, born in Schweinfurth, Bavaria, May 16, 1789. He was educated at the university of Jena; between 1815 and 1817 was editor of the *Morgenblatt*, published at Stuttgart; and in 1826 was appointed professor of oriental languages at Erlangen. In 1840 he was invited by Frederic William IV. of Prussia to Berlin, where he held a professorship at the university until 1849, when he retired into private life. During the great national uprising of 1818 he produced many spirited patriotic songs and sonnets. After the peace of 1815 he published his *Kranz der Zeit* ("Crown of the Time," 1817), a volume of lyrical and amatory pieces, followed in 1822 by *Estliche Rosen* ("Eastern Roses"). His fugitive pieces were published in 6 vols. in 1834-8, and selections from them in 1846 and 1851. He has also published *Morgenländische Sagen und Geschichten* ("Legends and Tales of the East," 2 vols., Stuttgart, 1837); *Rostem und Suhrab* (1838); *Brahmanische Erzählungen* ("Brahmin

Tales," 1839), &c.; beside admirable translations of Hariri's *Makamat*, under the title of "The Metamorphoses of Abu Seid" (3d ed., 1844), of the Indian tale "Nal and Damajanti" (8d ed., 1845), and of *Hamasa*, or the oldest popular songs of the Arabs (1846). He has also written several dramas, including "Napoleon," a political satire in 3 acts, and a "Life of Jesus," a summary of the four Gospels.

**RUDDER FISH**, one of the mackerel family, constituting the only described species of the genus *palinurus* (De Kay). It belongs to the division of the scomberoids in which the 1st dorsal is composed of isolated spines connected by a low membrane; the gill covers are serrated and spiny; there are one or more spines in front of the anal fin, which seems to remove it from the scomberoids with which in other respects it agrees; the body is elevated, compressed, and oblong, and the tail without lateral keel; the profile is vertical, and the teeth small, pointed, and nearly equal. The *P. perciformis* (De Kay), the black pilot, or the rudder fish of the fishermen of Martha's Vineyard, attains a length of from 9 to 12 inches; it is occasionally seen on the coasts of Massachusetts and New York. The color is bluish white on the sides, with minute black dots, the lower parts lighter; top of head and back with black blotches; in the young the color is a bright bronzed black, with obscure reddish hues; there are 8 short spines in front of the fleshy rays of the dorsal; a bony ridge is observed over the eyes, and there is a depression between them. It is generally found at sea, but is not uncommon at Holmes's Hole; it follows vessels into the harbor, keeping about the rudder, whence its name; it also keeps near casks, planks, logs, and other floating bodies. It has been caught in Boston harbor.

**RUDELBACH, ANDREAS GOTTLÖB**, a Danish theologian, born in Copenhagen in 1792. He studied at the university of his native city, and became a leader in that school of the Lutheran church which regards attachment to the old confessions of faith as a test of sound orthodoxy. He has published in Danish, beside other works, a translation of the confession of Augsburg and the "Apology," with an introduction and notes (Copenhagen, 1825), and edited, conjointly with Dr. Grundtvig, a theological monthly (*Theologisk Maanedsskrift*, 18 vols., 1825-8). In 1827 the direct influence of Rudelbach on the Lutheran church and theology of Germany commenced with contributions to the "Evangelical Church Gazette" of Hengstenberg, which he however discontinued a few years later, when he joined the unconditional opponents of a union between the Lutheran and Reformed churches. In 1829 he was appointed superintendent and consistorial councillor at Glauchau, in the kingdom of Saxony, where he remained until 1845, when he resigned in consequence of the German Catholic movement, and returned to Denmark. He founded, in union with Dr. Guericke,



the quarterly *Zeitschrift für die gesammte Lutherische Theologie und Kirche*, still the leading organ of the so called old Lutheran school in Germany. His other literary productions are very numerous. Nine volumes of his sermons have been published. Having returned to Denmark, he for some time lectured at the university of Copenhagen, but afterward became pastor of Slagelse.

RÜDIGER, FEDOR VASILIEVITCH, count, a Russian general, belonging to a Courland family, born in 1780, died in Carlsbad, Bohemia, June 22, 1856. He served as major-general in the campaigns of 1813-'14 in Germany and France, and as lieutenant-general in the Turkish war of 1828-'9. After the Polish insurrection of 1831, he was made general of cavalry. He served under Paskevitch in Hungary in 1849, aided in the battles of Waitzen and Debreczin, pursued Görgey on his retreat to Arad, and received his surrender at Világos, Aug. 13. In 1854 he was made lieutenant of the kingdom of Poland during the absence of Paskevitch in the Crimea.

RUDOLPH I. OF HAPSBURG, emperor of Germany, founder of the imperial house of Austria, born probably at the castle of Limburg or Limper in Breisgau, May 1, 1218, died in Gernmersheim, July 15, 1291. He was the son of Albert IV., count of Hapsburg and landgrave of Alsace, and passed his youth in the court and camp of the emperor Frederic II. On the death of his father in 1240, he succeeded to the landgraviate of Upper Alsace, the burgraviate of Rheinfelden, and with his brothers to the county of Hapsburg, and to some scattered domains in neighboring countries. These confined territories Rudolph immediately attempted to enlarge, and for several years was engaged in constant wars with the feudal lords of his native country. In 1245 he married a daughter of Burcard, count of Hohenberg and Hagenlock, and with her received as a dowry the castle of Oettingen in the valley of the Weile, and some domains in Alsace. He is not mentioned again in the contemporary annals until 1253, when he was one of a party which penetrated into the suburbs of Basel and burned a nunnery, and was excommunicated by Innocent IV. Subsequently he served under Ottocar of Bohemia in a crusade which had been proclaimed by the pope against the pagan Prussians, and also assisted that monarch against Béla IV. of Hungary. He was subsequently engaged for many years in a series of wars in Alsace and Switzerland, in which he was almost uniformly successful. He made himself exceedingly popular with the people of the neighboring republics, freed the highways from banditti, and so great was his reputation for justice and prowess that he was chosen by many of the cities as their prefect and protector and the leader of their armies. In 1265 he became prefect of Zürich, which involved him in a war with Lutold, baron of Ratisbon, which lasted several years, the arms of Rudolph being finally

successful. Several nobles of his family and party having been treacherously massacred at a tournament by the citizens of Basel under the lead of their bishop, Rudolph marched in 1273 against the city, ravaged the territory, and forced the bishop to sue for a truce of 24 days. While encamped before Basel waiting for the expiration of the truce, he was surprised by the announcement of the fact that he had been unanimously chosen king of the Romans and emperor by the electors in preference to Alfonso of Castile and Ottocar of Bohemia. Basel immediately opened its gates in spite of the angry remonstrances of the bishop, who, indignant at the success of his rival, profanely said: "Sit fast, great God, or Rudolph will occupy thy throne!" The unexpected election of the count of Hapsburg had been in great measure secured by the influence and exertion of Werner of Eppenstein, elector of Mentz, who, on his journey to Rome to receive from the pope the pallium and the confirmation of his office as archbishop, had been escorted by Rudolph himself across the Alps, as the road was infested with banditti, and was also treated on his return with great magnificence. Rudolph accepted the imperial crown, and immediately strengthened himself after his coronation at Aix la Chapelle by the marriage of his two daughters, Matilda and Agnes, to Louis, duke of Bavaria, and Albert, duke of Saxony. As his election was acknowledged neither by Alfonso of Castile nor by Ottocar of Bohemia, his first aim was to secure the ratification of his right from the pope, Gregory X. This was finally obtained, and with much difficulty Alfonso was persuaded by the pontiff to renounce his pretensions. A war, however, followed with Ottocar, and after the successful battle of the Marchfeld (Aug. 26, 1278) Rudolph came to an agreement with Otho, margrave of Brandenburg and nephew of Ottocar, by the terms of which the former was to hold Moravia for 5 years and retain possession of the Austrian provinces. Rudolph's chief aim was now to secure the Austrian territories to his own family, and after considerable difficulty he succeeded in transferring them, and intrusted his son Albert with their administration. After several ineffectual attempts to restore the imperial power in Italy, he abandoned the claims of the empire on that country, and confirmed to the Roman see a large territory, saying of the expeditions of the German kings beyond the Alps: "Rome is like the lion's den in the fable; I discover the footsteps of those who went toward it, but none of those who return." He now turned his attention to the internal regulation of the empire, which he had been compelled by his war with Ottocar to lay aside. He persuaded or compelled the electors, princes, and states not to carry on war with each other, but to refer their differences to arbitration, and with this object in view revived the office of imperial judges. He also with much difficulty and danger enforced the law forbidding the

building and maintenance of fortresses not essential to the security of the empire, and in the execution of his purpose condemned to death 29 nobles of the most illustrious families of Thuringia, and in one year razed 70 castles and strongholds, the habitation of banditti or powerful barons. He constantly visited the various cities of the empire, and in consequence of the numerous edicts and decrees he issued was called by a contemporary prince *lex animata*, the living law. He subsequently engaged in a successful war with the count of Savoy, and compelled the count of Burgundy, who had transferred his allegiance to the king of France, to do him homage. In 1288 he led an army of 30,000 men against the city of Bern, but was unsuccessful. He subsequently arranged the affairs of Bohemia, delivering the young king Wenceslas II. from his captivity, and marrying him to one of his daughters. He was greatly mortified at the refusal of the diet of Frankfurt in 1291 to choose his son Albert as his successor. He set out for Spire, and died on the way, but his body was buried there. He was succeeded on the imperial throne by Adolphus of Nassau.

**RUDOLSTADT.** See SCHWABBURG-RUDOLSTADT.

**RUE**, the name of a familiar garden plant, typical of the natural order *rutacea*, or polypetalous exogenous trees, shrubs, and herbs. They have opposite or alternate leaves, which are either stipulate or without stipules, and for the most part punctate; the inflorescence variable, either axillary, terminal, solitary, or clustered; the flowers regular or irregular, and in general united, though sometimes separated by abortion. They are found indigenous to the south of Europe, the Cape of Good Hope, New Holland, and equinoctial America. All the species are characterized by a powerful odor and bitter taste.—The genus *ruta* or rue comprises about 20 species, but the common garden rue is the most important. They are all, like it, herbaceous perennials, with alternate pinnated or decomposed leaves, destitute of stipules and covered with pellucid dots; the flowers usually yellow and disposed in terminal corymbs or racemes. The common garden rue (*R. graveolens*, Linn.) is an herb with a hard woody stem at base, glaucous branches and leaves, yellowish green flowers with wavy petals, terminal carpels, and roundish, warted, 4-lobed fruit. The terminal flowers are usually pentamerous, the others tetramerous, and the stamens are remarkable for their irritability.—The old name for rue was "herb of grace," given to it on account of its use in exorcisms. It was associated with rosemary, and used on like occasions. The rue grows readily from seeds and cuttings. The leaves and unripe carpels are medicinal, containing a bitter extractive and a volatile oil which has the peculiar odor of rue and a bitter acrid taste; it does not redden litmus paper. The oil of rue of commerce is frequently a mixture of oil of turpentine with

petroleum and oil of rue. The medicinal qualities of rue are powerfully stimulant, antispasmodic, and tonic.

**RUFF**, a wading bird of the sub-family *triniginae* or sandpipers, and the genus *philomachus* (Möhr.). The bill is as long as the head, straight, rather slender, with sides compressed and grooved, and slightly dilated at tip; wings long and pointed, the 1st and 2d quills longest and equal; tail moderate and nearly even; tarsi long and slender, covered in front with transverse scales; toes moderate, the lateral ones unequal, with the outer united to the middle as far as the 1st joint, and the hind one elevated and short. The ruff, or *P. pugnax* (Gray), is about 10 inches long, and the bill  $1\frac{1}{2}$ ; above it is varied with black, rufous, and gray, arranged in oblique bands on the scapulars and tertiaries, and whitish below; primaries dark brown, with green reflections above and with inner webs finely mottled toward the base; the tail, except the 3 outer feathers, transversely barred; sides of rump white, bill brown, and legs yellow. The males in spring have the feathers of the neck developed into a kind of ruff, whence the common name, and the face is covered with reddish papillæ; they fight during the breeding season, unlike most wading birds; they are also polygamous, and larger than the females, in these 8 respects seeming to form one of the links between wading and gallinaceous birds; the females are called reeves. The colors of the ruff vary exceedingly, and no two are precisely similar. They are natives of northern Europe and Asia, migrating southward during winter; they have been killed so often on Long island as to entitle the species to a place among North American birds, though it does not properly belong to our fauna. They are found chiefly in flocks, in marshy and moist districts; they feed at night, on worms, insects, and larvæ; the nest is made of coarse grass, and is placed in a hollow of the ground; the eggs are 4 or 5, pointed, green, with brown specks. Their flesh is highly esteemed for the table; they are taken alive in nets, and are fattened for market on bread and milk and boiled wheat, in a dark place to prevent their fighting; great numbers are sent from Holland to London.

**RUFFINI**, GIOVANNI, an Italian patriot and author, born in Genoa about 1810. He was educated with his eldest brother for the bar, while a younger brother, Jacopo, studied medicine. In 1831 Giovanni and Jacopo were fellow students at the university of Genoa with Mazzini, between whom and themselves a close intimacy subsisted; and after the retirement of Mazzini to Marseilles an active correspondence ensued between the 3 friends, which resulted in the formation of a secret association for the union and independence of Italy under a republican government. The constitution of the association, to which the name of *La giovine Italia*, "Young Italy," was applied, was published by Mazzini in Mar-

seilles, and he also established in the same place a monthly magazine in support of the movement, to which the brothers Ruffini were contributors. The latter managed the affairs of the association in Italy. In 1833 Mazzini, deeming the time opportune for an armed demonstration, planned the invasion of Savoy, in connection with which the brothers Ruffini undertook to secure the city of Genoa and the vessels of war in the harbor, for which latter enterprise they had engaged the services of Garibaldi, who had recently joined the association. The scheme proved a failure from the outset (see MAZZINI), and King Charles Albert, gaining information of the plot, caused Jacopo Ruffini to be arrested and hanged after a mock trial. Giovanni was enabled to make his escape in consequence of the arrest by mistake of his elder brother, who was not a member of the association and was innocent of the designs of its leaders. In Jacopo the Italian cause lost its ablest leader, and it is said that since his death Mazzini has never been seen to smile. Giovanni found an asylum in France, and thence retired to England, where he took up his permanent residence. Although an ardent patriot, he ceased to participate actively in the measures by which his friends hoped to regenerate Italy, but pursued a life of literary leisure to which his tastes inclined. In 1848 he accepted the amnesty offered by Charles Albert to political exiles, and for a short time discharged the functions of Sardinian ambassador at Paris. But after the failure of the Italian movement in 1849 he returned to England, where he has since resided. He is married to an English lady, and writes English with extraordinary fluency and elegance. He has published "Lorenzo Benoni, or Passages in the Life of an Italian," an autobiographical narrative (London, 1853); "The Paragreens' Visit to the Paris Exhibition" (1855); "Doctor Antonio" (1855); and "Lavinia" (1860).

RUFINUS OF AQUILEIA, an ecclesiastical writer of the ancient church, born about the middle of the 4th century at Julia Concordia, a little town near Aquileia, died in Sicily in 410. While yet a catechumen he retired to a convent in Aquileia, where he was baptized in 370 in the presence of his friend Jerome. A few years later he went to Egypt, where he spent 6 years, sharing the monastic life of the anchorites of the Nitrian desert. From Egypt he went to Palestine, where he was for several years superior of a community of anchorites on the Mount of Olives, and was ordained priest by the bishop of Jerusalem. After the outbreak of the Origenistic controversy he fell out with Jerome, who was one of the principal assailants of Origen, while Rufinus was his chief advocate among the western churches. In 397 he went to Rome, where he translated into Latin the apology of Pamphilus and Eusebius for Origen, and Origen's work *Περὶ Ἀρχῶν*. Meeting with much opposition in Rome in consequence of these publications, he went with

a recommendatory letter of Pope Siricius to Aquileia. The successor of Siricius, Anastasius, summoned Rufinus to Rome, and, the summons not being heeded, declared himself against Origen and Rufinus. On the invasion of Italy by Alaric, Rufinus fled to Sicily. Beside the works already mentioned, he wrote in 401 an apology, usually called *Invectiva*, against Jerome, commentaries on the Apostles' Creed and the prophets Hosea, Joel, and Amos, and a work on the monks of the Nitrian desert. He also translated a large number of works from the Greek, as the writings of Flavius Josephus, Origen, Basil the Great, and Gregory Nazianzen, and he made a free translation of the "Church History" of Eusebius, to which he added a continuation in 2 books, reaching to the year 395.

RUGBY, a market town of Warwickshire, England, on the river Avon, 16 m. N. E. from Warwick, and 88 m. N. W. from London; pop. in 1851, 6,317. It is on the line of the London and north-western railway, and several other railways meet there. The grammar school, of which Dr. Thomas Arnold was head master from 1828 to 1842, was founded in 1567 by Lawrence Sheriff, a London tradesman born in Rugby. It has 14 teachers and about 400 students, with an income from its endowment of about £5,000, and 21 exhibitions to the universities, each of £60 per annum for 7 years.

RUGE, ARNOLD, a German politician and author, born at Bergen on the island of Rügen in 1802. As a student at the university of Jena he was an active member of the *Burschenschaft*, and suffered on that account an imprisonment of 6 years. While in prison he published a translation of Sophocles' *Œdipus in Colonus* (Jena, 1830), and a patriotic drama, *Schill und die Seinen* (Stralsund, 1830). He next lectured at the university of Halle, and published among other works a *Platonische Æsthetic* (Halle, 1832), from the Hegelian standpoint. In 1838 he established with his friend Echtermeyer the *Hallische Jahrbücher*, and became one of the leaders of the radical party of Germany. In 1841 he left Halle to avoid the Prussian censorship of the *Jahrbücher*, and settled at Dresden. But in 1843 the periodical was suppressed by the Saxon government, and Ruge went to Paris, where he published for a short time the *Deutsch-französische Jahrbücher*. He next resided in Switzerland, and in 1846 returned to Saxony. In the same year he published his complete works (4 vols., Mannheim). After March, 1848, he edited the *Reform* newspaper, first at Leipzig, and afterward at Berlin, and was elected by the city of Breslau member of the German parliament. He however soon resigned, and continued his political activity at Berlin and Dresden, whence he escaped on the suppression of the insurrection of May, 1849, and finally took refuge in England, where he has since resided. In 1860 he commenced a German translation of Buckle's "History of Civilization."

RÜGEN, the largest island in the Baltic, belonging to Prussia, included in the administrative district of Stralsund, province of Pomerania, and separated from the mainland by a channel from  $\frac{1}{2}$  to 2 m. wide; area, 388 sq. m.; pop. in 1852, 43,525. The coasts are indented by numerous bays and arms of the sea, which divide the island into several peninsulas, but they are all shallow and obstructed by sand banks. The surface presents a great variety of hill and dale, and the scenery is very beautiful. There are many ancient sepulchral mounds on the island. Rügen was governed in former times by princes of its own, but the Danes conquered it in 1168. The Swedes gained possession of it during the 30 years' war, and it was ceded to them at the peace of Westphalia, but it was transferred to Prussia in 1815.

RUHMKORFF COIL. See MAGNETO-ELECTRICITY, vol. xi. p. 69.

RUM, a spirituous liquor distilled from fermented molasses, the refuse juice and scum from the sugar manufacture, and the spirit wash or lees (known as dunder) of former distillations. A peculiar volatile oil comes over in the first part of the process, which imparts to the rum its flavor. The manufacture of rum has long been carried on extensively in connection with that of sugar and molasses upon the plantations of the West India islands. Jamaica rum ranks first in quality, and that made in Santa Cruz is also favorably known. The rum produced in the Leeward islands is inferior in strength and flavor, and the price is usually  $\frac{1}{3}$  less than that of Jamaica rum. The liquor is sometimes flavored with slices of pineapple, when it is known as pineapple rum; and in England the artificial pineapple flavoring is used to convert ordinary whiskey into an imitation of this liquor. Some rum is produced in the Mauritius and East Indies. In the New England states rum has been largely distilled from molasses. In Newport, R. I., it is stated there were in the last century no fewer than 30 of these manufactories, and their product was a staple article in the African slave trade. The materials named above are employed in various proportions at different places. In some the proportion of spent wash already used several times over is so great as to seriously impair the flavor. The fermentation is continued upon large quantities of material at a time from 9 to 15 days, according to the strength of the wash and condition of the weather. When the wash has attained nearly its maximum degree of attenuation, it is pumped up as soon as possible into the stills and worked off at a properly regulated heat. The greatest cleanliness in all the vessels is necessary to guard against the acetous fermentation, and they should be scalded after every operation with boiling water and quicklime; it is also advisable to keep the wash covered up from access of air and add to it a little sulphite of lime. Rum often has a deep red color, which is acquired from molasses or caramel added for the purpose, and not from

the wood of the casks as is commonly supposed. Unlike other spirits, rum tends to cause perspiration. Its consumption in the United States was formerly much larger than at present. Here and in Great Britain it was the common liquor furnished to the army and navy, and is still so used in England. Its importation and production are very large, the liquor being chiefly exported to foreign countries. More than one third of the whole exportation is to Africa, next to which Turkey takes the largest amount, and after this France. The total exportation in 1860 was 2,855,952 gallons, valued at \$930,644.—The adulterations of rum sold in England were found by Dr. Hassall to resemble those of gin, consisting chiefly of water, and of cayenne pepper, or of *cocculus Indicus*, added to give apparent strength; and lastly of burnt sugar to restore the color, and unburnt sugar to restore the sweetness lost by dilution. The proportion of alcohol was found to vary from 47 to 27 per cent., and though rum of the latter quality sold for nearly the same as of the former, its actual value was only about half as much. Cayenne was detected in 6 out of 20 samples examined. Fatal effects have attended the introduction of *cocculus Indicus*.

RUMELIA. See RUMELIA.

RUMFORD, BENJAMIN THOMPSON, count, an American inventor, born in Woburn, Mass., March 26, 1753, died at Auteuil, near Paris, Aug. 21, 1814. He was educated at the common school in his native place, afterward at Medford, and at the age of 13 entered the counting house of a Salem merchant, where he remained until the operation of the non-importation agreement rendered his services unnecessary. During this time, and for several subsequent years, while engaged as clerk in a dry goods store and in teaching school, he employed much of his leisure in the investigation of his favorite subjects of medicine and physics. In 1770 he taught an academy in Rumford (now Concord), N. H., and in 1772 married Mrs. Rolfe of that place, a wealthy widow considerably his senior, and was made major in the militia of New Hampshire by the royal governor. This exciting the jealousy of older officers over whose heads he was placed, he was charged with disaffection to the cause of the colonies, driven from his home, and afterward from his stepfather's residence in Woburn, and finally took refuge in Boston, where he became an associate of Gen. Gage and the other British officers. He was subsequently tried at Woburn, and, though not condemned, was refused a full acquittal, and afterward made an unsuccessful effort to obtain a commission in the continental army. Suspected and watched, he at last left the American lines, and after Boston fell into the hands of the continental army carried over to England the despatches announcing that event. There he was employed by Lord George Germain, secretary of state for the department of the colonies, and in less than 4 years became under secretary of

state. After the retirement from office of Lord Germain Mr. Thompson returned to America, and there formed a regiment of dragoons, of which he received the command with the rank of lieutenant-colonel. On his return to England he found hostilities at an end, and obtaining leave of absence visited the continent of Europe. At Strasbourg he met Prince Maximilian of Deux Ponts, afterward king of Bavaria, and not long after entered the service of the elector of Bavaria by permission of the English government, who conferred upon him the honor of knighthood. Toward the end of 1784 he settled in Munich with the appointments of aide-de-camp and chamberlain to the reigning prince. Here he reorganized the entire military establishment of Bavaria, and introduced a simpler code of tactics and a new system of order, discipline, and economy among the troops. In the beginning of 1790 he undertook the more laborious work of suppressing beggary in Bavaria, which had become a profession, and of inculcating habits of industry and order in the people of the lower class who had been engaged in the business. In this he was successful, and was also wholly or partially so in other reforms and improvements he proposed, such as the establishment of a military school, the improvement of the breed of horses and of horned cattle in the Bavarian territory, and the conversion of an old hunting ground near Munich into a park, where after his departure the inhabitants erected a monument in his honor. For these various services he had been successively raised to the rank of a major-general in the army, member of the council of state, lieutenant-general, commander-in-chief of the general staff, minister of war, and count of the holy Roman empire, on which occasion he chose as a title the name of the place in America in which he had resided. His exertions in the establishment of his great works, some of which met with much opposition, rendering his health feeble, he made a tour in Italy; but not finding himself recovered, he visited England, reaching that country in Sept. 1795, and on his arrival in London was robbed of a trunk containing all his private papers and original notes and observations on philosophical subjects. There he was treated with much attention, and in consequence of his advice being asked on all occasions, he published the results of his experience and the record of his labors in Bavaria in a series of essays. Having long made a profound study of the subject of heat, he now set about devising a remedy for smoky chimneys, at that time in England a great evil; and the result was the discovery of the leading principles upon which fireplaces and grates for coal are still constructed, the invention of cooking ranges, and many other economies in the production and employment of heat. Returning to Bavaria when that country was threatened by the war raging in 1796 between France and Austria, he was appointed head of the council of regency during

the absence of the elector, and while in that position succeeded in maintaining the neutrality of Munich; and for his services in this respect many honors were conferred upon him, one of which was an appointment to the superintendency of the general police of the electorate. As the climate did not agree with him, after spending two years in public duties and private studies, he determined to fix his residence in England, and accordingly was named minister plenipotentiary and envoy extraordinary to the court of St. James. In this capacity, however, the English government, acting on the rule of inalienable allegiance, refused to recognize him. He received at this time an invitation from the administration of the United States to revisit his native land, and appears to have had thoughts of taking up his residence here. While in England he was largely concerned in the affairs of the royal institution, of which he was the real founder. After the death of Charles Theodore, elector of Bavaria, and the succession of his son Maximilian Joseph, Rumford gave up his citizenship in the electorate, and finally settled at Paris. He married in 1804 for his second wife the widow of Lavoisier, and with her retired to the villa of Auteuil, the residence of her former husband. There he spent the remainder of his life engaged in philosophical and chemical experiments, and the improvement of his domain. His marriage with Mme. Lavoisier was not a happy one, and in the society of the French metropolis he does not seem to have been popular. Beside his essays referred to above, he contributed a large number of papers to various scientific journals. Before his departure from America he had commenced investigations into the strength of materials and the force of gunpowder, which were continued in England and Bavaria, resulting in great improvements in artillery; and on the subjects of light and illumination he also made many experiments and discoveries. Some years before his death he instituted prizes for discoveries in light and heat, to be awarded by the royal society of London and the American academy of sciences, of which he himself received the first on the former subject from the royal society; and he bequeathed to Harvard university the funds by which was founded its professorship of the application of science to the art of living.

RUMIANTZOFF, or ROMANZOFF, PETR ALEXANDROVITCH, count, a Russian general, born in St. Petersburg in 1780, died on his estates in Mobilev, Dec. 17, 1796. Serving in the 7 years' war, he was in the battle of Kunersdorf in 1759, and in 1761 took Colberg. Peter III. had given him the command of the projected expedition against Holstein just before his assassination; on that event, he sent in his resignation, but was at once appointed by Catharine II. governor of Little Russia, and in 1769 put in command of the 2d army corps in the expedition against the Turks; in the autumn of the same year he succeeded Prince Gallitzin

as commander-in-chief; and the next year, in two well fought battles, he defeated the Tartars and the Turks on the Pruth and the Danube. In 1771 he captured Giurgewo; and resuming hostilities after a truce of 1½ years, he crossed the Danube again, and in 1774 besieged the grand vizier in his camp at Shumla, and compelled him to ask for peace, which was concluded at Kutchuk-Kainarji. Catharine loaded him with honors. In 1787, the war against Turkey having recommenced, he again took command, but in 1789 he resigned, and retired to his estates.

**RUMINANTIA** (Lat. *rumino*, to chew the cud), an order of mammals, characterized by the absence of incisors in the upper jaw in almost all cases, their place being supplied by a callous pad; 6 lower incisors; canines inconstant; molars usually 6 on each side in each jaw, with flattened crowns and irregularly crescentic folds of enamel; stomach compound, with 3 or 4 cavities, in connection with the act of rumination; cæcum large; placenta generally cotyledonous; and feet ungulate and bisulcate. This order is equivalent to the *pecora* of Linnaeus, and includes such animals as the camel, deer, giraffe, antelope, gnu, goat, sheep, and ox. Except the camels, most of the genera are provided with horns, solid and deciduous as in the deer, or hollow and permanent as in the ox and sheep. They are of moderate or large size, and generally rapid runners; they feed in herds, headed by an old male, and are exclusively herbivorous; the shape in most is light and elegant, and the limbs long and slender; the skin is covered with hair or wool; the eyes are large, full, and often very beautiful; the ears long, erect, very movable, and more or less pointed; the tail varies much in length and covering. They inhabit vast plains, the forests of the north, and the dry deserts of the tropics, their speed taking them in a few hours from an exhausted to a rich feeding ground, and from a sandy waste to a well watered region. Of timorous and watchful disposition, they wage no war on each other or on other animals, except during the pairing season; taking to flight at slight causes of alarm, when brought to bay they fight boldly with their horns and antlers, and strike powerful blows with their sharp front hoofs. Some are bulky and clumsy like the camel and giraffe, others strong and slow like the ox, or graceful and gentle like the gazelle and antelopes. The characters of the different families have been given under their respective titles, so that only the general relations need here be alluded to, for the purpose of embracing the chief points at a single glance.—The camels are hornless, and approach the pachyderms in some respects; the 1st cavity of the stomach has a remarkable apparatus of water cells; the feet are not entirely bisulcate as in typical ruminants, and are callous beneath with the toes distinct at the tip; there is no foramen in the 6 lower cervical vertebrae for the vertebral artery, an ar-

angement not found in any other living mammals; the placenta has not the usual cotyledonoid form of ruminants. Among the deer, the musks have no horns, and have long canines in the upper jaw; the antelopes have hollow horns, with a small, solid, persistent bony axis covered with horn; they have a slender figure, adapted for rapid progression, and like the stags have infraorbital glandular sinuses. In the goats the horns are directed upward and backward, and the chin is bearded; in sheep the horns come at first spirally forward; and neither have lachrymal sinuses. The ox family may be at once known by their bulk, broad muzzle, powerful limbs, and general lateral direction of the horns. The skull is of a triangular shape, the apex forward, the forehead straight and high, the orbits far apart, and the muzzle, except in the oxen proper, pointed; the cranial cavity is small, and the bones of the face occupy about  $\frac{2}{3}$  the length of the skull; the parietal is single, the frontals are large and broad, and generally support the horns; the dermal bones which constitute the horns of the giraffe rest over the coronal suture, partly on the parietal and partly on the frontal bones, do not become united with the cranium except by suture until late in life, and are not epiphyses of the cranial bones; the sphenoid articulates generally with all the cranial bones, but its orbital wing is mostly within the cerebral cavity. In the face, the intermaxillaries are much developed, but in most cases have no teeth; the maxillaries usually with 6 teeth on a side; palate bones largely developed; lower jaw narrower than the upper, long, with rounded prominent angle, and very long coronoid process curved backward; the glenoid cavity is shallow, and the condyle flat and transverse, admitting the free lateral motions necessary for chewing the cud. In the giraffe the air cells usually existing as frontal sinuses are extended backward as far as the occiput over the cranial cavity and beneath the horns, equalling the former in vertical extent, and traversed by stout bony partitions; the great vertical diameter of the occipital condyles enables this animal to put the head in a line with the neck, and according to Owen even beyond this line.—The deciduous horns of the ruminants may be rounded as in the stag, roebuck, and Virginia deer, or palmated as in the moose, reindeer, and fallow deer; they are usually symmetrical as to position and size, but not as to arrangement of the divisions; there is an intimate connection between the horns and the generative system, as their development may be arrested and their periodical shedding prevented by castration. There are seldom more than 2; but in the fossil *sicatherium* of the tertiary of the Sivalik hills there are 4, also in the 4-horned sheep, goats, and antelopes; sometimes there are even 5 in the domesticated sheep. The solid horns have been described under **BUCK**, and **DEER**; these antlers fall by a process having a close resemblance to that by which in necrosis the

dead is separated from the living bone; after the pairing season has passed the circulation stops in the horns, and they become dry and dead, and separate from the frontal bone by absorption carried on by the Haversian canals; these, acting on one plane through the whole thickness of the bone just below the burr, remove the solid materials around them, so that each canal finally unites its cavity with that of an adjoining one; when this has extended entirely across the base the antler falls. Prof. J. Wyman ("Proceedings of the Boston Society of Natural History," vol. vii. p. 168, 1859) regards the antlers as dermal bones rather than parts of the internal skeleton, because they are developed in the integuments by a special centre of ossification, and become attached to the frontal only after ossification has somewhat advanced. In the hollow horns of the ox, sheep, and antelopes, the frontal bony cores are cylindrical shafts, more or less solid, protected by periosteum and an extension of the true skin, of which the epidermic portion is developed into a dense horny sheath; in most the frontal sinuses extend into the cores.—The cervical vertebrae are always 7; the dorsals usually 13, but 12 in the camel and 14 in the giraffe; the lumbar 6, but 5 in the giraffe and 7 in the camel; sacral 4, but 5 in the ox and 3 in the musk deer; the caudals vary from 12 in the goat to 18 in the ox and 20 in the giraffe, the whole number ranging from 42 in the goat to 50 in the giraffe. The bodies of the cervicals are much lengthened in the camel and giraffe, and articulated by a ball and socket joint, and the spinous and transverse processes are short; the dorsals are remarkable for their long spinous processes for the attachment of the *ligamentum nuchae* which suspends the head; the transverse processes of the lumbar, as in the ox, are largely developed, but smaller in the swift and supple antelopes and deer; the chest is compressed laterally; the ribs and pelvic bones are stout in the camels and ox, and more slender in the deer; the sternum is flattened, and attenuated in front; the clavicles are always entirely absent, hence there is no prehensile power in the fore limbs; the scapula is triangular, the apex downward, its neck much elongated, the coracoid process rudimentary or absent, and the infraspinous fossa much the largest; the humerus is massive according to the strength and activity of the species, and is connected to the bones of the forearm by a simple hinge joint; the radius and ulna are intimately united and always in the condition of pronation (with the palmar surface backward), the upper end of the ulna being very thick; the wrist contains always at least 6, and in the camel and giraffe 7 bones, in 2 rows; the metacarpus is represented by a cannon bone, itself made up of the 3d and 4th bones, and sometimes has 2 splint bones, the homologues of the 2d and 5th; in those having more than 2 hoofs, the supplementary ones are rudimentary, and do not under ordinary circumstances reach the ground;

the hind limbs, taking the individual bones, are longer than the fore; there is nothing peculiar in the femur, the patella is comparatively small, the tibia has a remarkably prominent spine, and the fibula, when present, is extremely rudimentary; the tarsus consists of 5 bones, and the metatarsus is composed as the metacarpus. The cloven hoof imparts elasticity to the spring, and enables the foot to be more easily withdrawn from soft ground as well as to sink less readily in mud or snow; to prevent injurious friction between the hoofs, a special glandular apparatus secretes a lubricating matter; the two small accessory hoofs are of great use to these animals in descending steep declivities.—In those which have incisors in the lower jaw only, the opposing surface in the upper jaw is a hardened pad-like gum; these tear rather than cut during feeding, accompanied by a swinging movement of the head forward, which is easily effected by the powerful muscles of the neck; when 8 incisors are present, the outer 2 have been regarded by some as canines. The molars are widely separated from the incisors, the 8 posterior or the true molars being composed of 2 columns in the upper jaw convex internally and flat with 3 prominent ribs externally; in the lower jaw the convex surface is external and the flat internal; they are surrounded by a thick layer of enamel, folded inward so as to form 2 semilunar figures in each column, in the worn teeth presenting 4 crescentic enamel folds whose interstices are filled with dentine; the 3 anterior molars have each a single column with 2 crescents of enamel; their crowns are quadrilateral, with convoluted margins, admirably adapted for the mastication of the coarse vegetable substances which constitute most of the food of ruminants. The last 3 molars are not replaced, but the anterior 3 are; from this the jaws of young animals may be easily recognized. The tongue generally performs the office of prehension as well as deglutition; the anterior part collects and judges by the touch of the nature of the food, the next portion prepares the morsel and thrusts it backward toward the oesophagus, and the basal part regulates the movements of the whole organ from its insertion in the hyoid bone; the papillae, fungiform, and filiform in front, conical and circumvallate behind, are largely developed.—The salivary glands are large, with long ducts; tonsils bulky, and oesophagus thick and muscular. The stomach is fourfold, the first 3 cavities (paunch, honeycomb bag, and manyplies) being essentially dilatations of the oesophagus for the purpose of rumination, and leading to the 4th or true digestive cavity; in the 4th, the only one developed in the newly born animal, there is in the calf an organic acid secreted, possessing the power of converting the albumen of milk into curd or whey, in the prepared condition called rennet. Concretions of balls of hair, the results of hairs swallowed when licking their own or others' hides, felted together by



the movements of the stomach, and incrustated with a polished earthy deposit of great hardness, are often found in the stomachs of ruminants, especially of the cow. The intestinal canal is very long and of simple construction; compared to the length of the body it is, according to Meckel, as 12 to 1 in the camel and deer, 22 to 1 in the ox, and 28 to 1 in the sheep; the large intestine is often scarcely wider than the small; the cæcum is always large, smooth, and without lateral bulgings. The liver is simple, small, and wedge-shaped, slightly divided into lateral lobes; in the camels and deer there is no gall bladder, but it is always present in the hollow-horned ruminants; the pancreas and spleen are comparatively small. In the heart the auricles are relatively small as compared with the ventricles; in some (in common with pachyderms) there are 1 or 2 small ossifications in the partition between the ventricles; the aorta close to the heart divides into 2 unequal trunks, the smaller passing forward and supplying the head, and the larger descending backward; the internal carotids give off many tortuous and intercommunicating branches within the cavernous sinus, like the *retia mirabilia* in the sloths, seals, and cetaceans, in other parts than the head; according to Weigel, the portal vein is furnished with valves. Most have the right lung divided into 4 lobes, and the left into 2; the thymus gland is extensively developed; the fat is very brittle, and is called suet to distinguish it from the softer lard of the hog. The brain is long and oval, and relatively small, that of the ox compared to that of man, considering the size of the body, being as 1 to 24; the hemispheres are smaller in proportion to the cerebellum and medulla oblongata than they are in man; the convolutions are numerous, and the cerebellum is divided into several irregular lobules; the base is flattened, and the posterior pair of the *tubercula quadrigemina* are in most much smaller than the anterior; the lateral ventricles intercommunicate; the spinal cord and cerebral and spinal nerves are large. The eyes are wide apart, and so prominent that the range of vision is very extensive; the opening of the pupil is transverse, and the *tapetum* is exceedingly brilliant. The senses of hearing and smell are highly developed, and the cranial sinuses are extensive. The urinary bladder is generally of large size; the testes are included in a pendulous scrotum, and the *testicula seminales* are largely developed; in the musk deer there is a special glandular pouch communicating with the preputial cavity, from which is obtained the substance musk, once extensively used as an antispasmodic and as a perfume. The uterus is prolonged above into 2 horns, which are furnished with glandular protuberances, highly vascular, with eminences and depressions for the implantation of the tufted filaments of the placental cotyledons; these are productions of the chorion, of an oval or rounded shape, and

come away with the membranes after parturition; they are 70 to 100 in the sheep and cow, and are not found in the camels; the amnios is also highly vascular. The mammae are inguinal, and the teats 4, except in sheep and goats, which have only two. The *panniculus carnosus* muscle is remarkably and extensively developed, serving as a means of defence by shaking off flies and other stinging insects from the skin. In the camel there is a remarkable hump on the back, consisting principally of adipose matter developed in the subcutaneous areolar tissue, probably serving as a storehouse of nutriment to the animal during its long journeys. The hair is generally coarse, and never what would be called fur; it varies from the harsh and shaggy coat of the camel and the somewhat softer one of the llama to the fine wool of the sheep. Rumination is rendered necessary by the bulky character of the food as compared with its nutrient qualities; the timid animals of this order are naturally forced to take in a large amount of food in a short time, and then to flee from the carnivorous beasts always lying in wait for them to some retired place where they can remasticate it quietly; such is the air of quiet content in a ruminating animal, that this act is universally regarded as the type of peaceful and happy moments. In camels the bolus is triturated alternately from side to side; in horned ruminants and in the giraffe it is always in one direction, either from right to left or from left to right.—Ruminants embrace the animals most useful to man and the most easily domesticated; whole races of men count their wealth by the numbers they possess of them, whether camels, llamas, goats, sheep, reindeer, or cattle; they are among mammals what the *gallinae* are among birds; their flesh and milk are consumed as food, their skins, hair, wool, and horns are employed in the arts, and indeed almost every part is convertible into some product useful to man. Ruminants are distributed all over the world except in Australia; the reindeer and musk ox are found in the polar regions of both hemispheres, the llamas and alpacas in South America, the camels in Asia and Africa, the giraffe and most antelopes in Africa, and the deer everywhere in suitable feeding places; in North America there are only 2 antelopes, only one of the sheep family, and 2 of the ox family; there are no hollow-horned ruminants in South America as original species, though there are vast herds of wild cattle of foreign introduction. The distribution of fossil ruminants was in some respects different from that of the living species; for instance, the giraffe has been found fossil in France and the Sivalik hills, showing a warmer climate than now prevails in those regions; on the contrary, the reindeer has been found in S. Europe, indicating also a temporary diminution of heat, probably from the extension southward of the ice during the glacial period. There are many interesting coincidences of geographical distribution in geological and the

present times, bearing perhaps on the point of the origin of existing mammals, and in favor of the theory of their origin from the development of previously existing types, rather than from a distinct creative act after the entire destruction of the preceding fauna. Camels are found fossil in the Sivalik hills of Asia, llamas in the caverns of Brazil, musk deer in Asia and Africa, &c.; deer (*cervidæ*) are numerous in the diluvial formations of Europe, greatly resembling the present species, and, according to Pictet, some may be considered as the stock from which have been derived the present stag, reindeer, fallow deer, and roebuck, these, with also the goat and sheep, having survived the catastrophes of this disturbed period, and preceded the appearance of man in Europe. The fossil deer of Asia and America also very much resemble the existing species of these continents. The urus found by Julius Cæsar in Gaul, and the aurochs even now living in the forests of Lithuania, are interesting in connection with the origin of domestic cattle; these were probably indigenous, as a fossil urus and aurochs have been found in the diluvium of Europe. The fossil musk ox (*ovibos*) has been found in Siberia and North America, like the one now living in the polar regions. The ruminants show more transitions to other orders than would be supposed from the study of their living species, especially in the direction of the pachyderms; they appeared after the latter, and under forms very nearly resembling existing species; there were none in the eocene tertiary, when almost all herbivorous mammals were pachyderms, but appeared first in the miocene, and then became so numerous that in the subsequent epoch (pliocene) and during the diluvium they had entirely displaced the latter, at least in Europe. The *svotherium* of the Sivalik hills resembled pachyderms in its heavy form, short neck, and probable trunk (as indicated by the nasal bones). Among the gigantic animals of this order may be mentioned the great Irish elk, with enormous horns, found in the diluvium of Europe. The genus *macrauchenia*, as large as a rhinoceros, is peculiar to the southern regions of South America, and forms another remarkable transition form between ruminants and pachyderms. (See MACRAUCHENIA.)

RUMOHR, KARL FRIEDRICH LUDWIG FELIX VON, a German writer on art, born at Reinhardtsgrimma, near Dresden, in 1785, died in Dresden, July 25, 1843. He studied at the university of Göttingen, but at the age of 15 placed himself under the tuition of the painter Fiorillo. In 1804 he visited Italy, and in 1811 published the first of a succession of works on art, critical and historical, which extended during his life to about 20 volumes. In 1815 he returned to Italy, and commenced at Florence the studies for his "Italian Researches" on the history of art, two volumes of which were published in 1827, and the third in 1831. He also wrote several miscellaneous works.

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RUMSEY, JAMES, an American inventor, born at Bohemia Manor, Cecil co., Md., about 1743, died in England, Dec. 23, 1792. In Sept. 1784, he exhibited on the Potomac in the presence of Gen. Washington, who certified to the fact in writing, a boat which worked against the stream by means of mechanism. He subsequently gave his attention to steam as a motive power, and in March, 1786, succeeded in propelling a boat on the Potomac by a steam engine and machinery of his own construction, which secured motion by the force of a stream of water thrown out by a pump at the stern. A successful experiment on a larger scale in Dec. 1787, was witnessed by a large concourse of people. About the same time he became involved in a controversy with John Fitch, who had been experimenting in steam navigation on the Delaware. (See FITCH, JOHN.) In 1788 the "Rumsey society," of which Benjamin Franklin was a member, was formed in Philadelphia to further the schemes of the inventor, who in the same year went to England, where he met with considerable encouragement. A society similar to that in Philadelphia was formed in London, a boat and machinery were built for him, and he obtained patents for his inventions in Great Britain, France, and Holland. A successful trip was made with his boat upon the Thames in Dec. 1792, and he was preparing for another experiment when his death occurred. In 1839, by a joint act of congress, a gold medal was presented to his son, James Rumsey, "commemorative of his father's services and high agency in giving to the world the benefit of the steamboat."

RUNEBERG, JOHAN LUDVIG, a Finnish poet, born in Jakobstad, Feb. 5, 1804. His family being poor, he was educated by subscription, was graduated at the university of Abo in 1827, in which in 1830 he became teacher of æsthetics, and in 1844 professor of Greek in the gymnasium at Abo. He writes in Swedish, and, without ever having been in Sweden, is the most popular living poet in that tongue. Poetical translations from his poems are given in William and Mary Howitt's "History of the Literature and Romance of Northern Europe."

RUNES (Gothic, *runa*, secret), ancient Scandinavian characters, forming an alphabet, according to general belief, of 16 letters. In Sweden ancient inscriptions on rock or stone monuments are found chiefly upon the shores of the lake Mælär, in the neighborhood of Upsal and Sigtuna; and here as everywhere they are written in Icelandic with runic characters. Saxo Grammaticus, who wrote in the 12th century, says that the early Danes engraved verses upon rock and stone monuments, in honor of their ancestors' heroism; but he gives no examples, and as many rune stones describe the deaths of Christians, it is probable that the zeal of the early Christians led them to destroy runic records of pagans. The runes were engraved not only on stone, but upon arms, cups, amulets, instruments of various kinds, and also

upon the bark of trees and upon wooden tablets. In a biography of St. Anscarius a letter in runic characters is quoted, in the 9th century, from a Swedish king to Louis le Débonnaire; and in the 6th century Venantius Fortunatus invites his friend to correspond with him in Hebrew, Persian, Greek, or runic. The oldest runic MS. now existing is in the library of the university of Copenhagen, a collection of laws written in the 18th or 14th century. Much older inscriptions however exist. In 1834 Finn Magnusson deciphered the celebrated Harold inscription, which the physicist Berzelius believed to be an accidental vein, on a rock in the south of Sweden. Saxo Grammaticus relates that Waldemar I., who reigned in the 12th century, had tried in vain to render it. It is an Icelandic prayer that victory should crown the arms of Harold against the Swedish king Sigurd, A. D. 735. Runic characters, according to the doctrine of Scandinavian mythology, possessed magical properties.

RUNJEET SINGH, a rajah or sovereign of the Sikhs, in the Punjab, born at Gugazanwala, 60 m. W. of Lahore, Nov. 2, 1782, died there, June 27, 1839. He was the son of Maha Singh, sirdar or governor of one of the Sikh provinces, who died, leaving the government of his province to his son Runjeet, then 12 years of age, under the regency of his mother, whom the young sirdar is said to have poisoned when he arrived at the age of 17, in order that he might reign alone. His father had left him a full treasury and a position of influence over the neighboring sirdars, which he improved with such skill and success, that in the first years of his independent reign he had materially increased his territory and his power. A service which he rendered to the shah of the Afghans induced that monarch to grant him the title of king of Lahore, by which he was generally known to Europeans. He reduced several of the neighboring sirdars to become his tributaries, and took from the Afghans several important towns situated on the W. bank of the Indus. On April 25, 1809, he signed a treaty with the English at Loodiana, making the Sutlej substantially the boundary between his possessions and those of the East India company. He now reorganized his army by the aid of European officers, so that none of the native armies could stand against it; and in 1812 there were left but 3 independent sirdars in the Punjab, and in 1819 he had become the master of these also, as well as of the city of Peshawer in Afghanistan, and assumed to himself the title of *maharajah* (king of kings). By the employment of two skilful European officers, Messrs. Allard and Ventura, in 1822, he succeeded in bringing his troops into a still higher degree of efficiency, and crossing the Indus took the province of Peshawer lying along its W. bank. His conquests in Afghanistan occupied him for several years. In 1838 he entered into negotiations with the British for a closer alliance, but died before they were concluded.

RUNNERS. See ORTHOPTERA.

RUNNYMEDE, RUNNIMEDE, or RUNNEMEDE, a narrow slip of meadow land on the bank of the Thames near Egham, in the N. W. part of the county of Surrey, England, memorable as the place where in 1215 King John was compelled by his barons to grant the privileges contained in Magna Charta. The Egham races now take place upon this meadow.

RUPERT, PRINCE (PRINCE ROBERT of Bavaria), a royalist general of horse during the English civil war, born in 1619, died at Spring Gardens, Nov. 29, 1682. His mother Elizabeth was the eldest daughter of James I. of England, and had been married to Frederic V., elector palatine, who on the outbreak of the 30 years' war made an unsuccessful attempt to establish himself on the throne of Bohemia, and in consequence was deprived of his estates. The son shared in the misfortunes of his father, and received little education; but in the wars for the recovery of the Palatinate he early gave evidence of headlong bravery. At the age of 23, at the beginning of the civil war, he offered his services to his uncle Charles I. of England, and by him was placed at the head of a regiment of horse. He had been recommended to the king by the queen Henrietta Maria as "a person that is capable of doing any thing that he is ordered, but he is not to be trusted to take a single step out of his own head." He took Hereford, Lichfield, and Cirencester, and bore a prominent part in the battles of Worcester, Edgehill, and Chalgrove field, in which last engagement Hampden was killed. His daring and vigor had more than compensated for his want of prudence and military sagacity, and he was created by the king a knight of the garter and duke of Cumberland. He carried Bristol by assault on July 27, 1643, scattered the parliamentary forces at Newark, and subsequently gained distinction in the north of England, especially by the relief of Latham house, held by the countess of Derby against a detachment of Fairfax's army. All the glory from these brilliant enterprises was entirely obliterated by his ill success in the battle of Marston Moor, the fate of which was due to his own rashness and his want of concert with the duke of Newcastle. The king's confidence in his abilities, however, did not diminish, and he was promoted from the generalship of the horse to the command of all the forces, and while occupying this position took the city of Leicester. In the battle of Naseby, June 14, 1645, Prince Rupert commanded the left wing, and pursued the portion of the parliamentary army opposed to him a great distance, returning to find his own side defeated. Subsequently he took command of Bristol, the maintenance of which was essential to the success of the royal cause. The city was invested by Fairfax and Cromwell (Aug. 22), and was stormed on Sept. 10 and surrendered, the prince marching out with a convoy of 2 regiments of horse, and proceeding to Oxford. The same day a royal proc-

lamation was issued revoking and annulling all military authority given to "our nephew Prince Rupert." The king and the prince subsequently had a stormy meeting, and the latter left the service; but in 1648 he obtained the command of that portion of the fleet which adhered to the royal cause, and with it went to the coast of Ireland to assist Lord Ormond. Anchoring in the harbor of Kinsale, he was there blockaded by Blake with the parliamentary fleet until Oct. 1649, when he succeeded in forcing his way out with the loss of a few ships. He then sailed for Lisbon, closely pursued by Blake, from Lisbon to Carthage, and from Carthage to Malaga, and there made a prize of some English merchantmen. Hereupon Blake, who had hitherto been prevented from undertaking decisive action either by the Portuguese or Spanish authorities, attacked Rupert's squadron, and destroyed all but a few ships with which the prince escaped and made his way to the West Indies. There he remained some time, supporting himself by the capture of Spanish and English merchantmen, and then returned to France, selling his ships to the French government in behalf of Charles II. After the restoration he again made his appearance at the English court, and was made privy councillor. Under the duke of York he held a command in the fleet, and was present at the naval battle of Lowestoffe. In 1666, in conjunction with Lord Albemarle, he held command of the fleet which acted against the Dutch with various success. In 1673 he was also intrusted with the command of the fleet in place of the duke of York, who had resigned; but as he found the squadron ill manned and ill equipped, he returned home without engaging the enemy. During the latter years of his life he was governor of Windsor castle, and spent a large portion of his time in painting and engraving, and in mechanical and chemical experiments. He is generally regarded as the inventor of the mezzotint, although this may be doubted, and is also believed to have been the inventor of pinchbeck or prince's metal, and of the glass bubbles called "Rupert's drops." (See ANNEALING.) He was buried in Henry VII.'s chapel, Westminster.

RÜPPELL, WILHELM PETER EDUARD SIMON, a German traveller, born in Frankfort-on-the-Main, Nov. 10, 1794. He was destined by his father for a commercial career; but having travelled, on account of impaired health, through Italy, and thence to Egypt, on his return in 1818 he devoted himself to natural sciences, entered into connection with the Senkenberg scientific society of his native city, and in 1822-'7 travelled in Nubia, Sennaar, Kordofan, Dongola, and Arabia. The Senkenberg society received the rich collections which were the fruits of his first journeys; others collected in a later journey through Abyssinia, in 1831-'4, with reference to history, antiquities, and geography, as well as natural sciences, he presented to the city library of Frankfort, receiving in compen-

sation for his large travelling expenses a small annual pension from the city. His principal works are: *Reise in Nubien, Kordofan und dem peträischen Arabien* (Frankfort, 1829); *Reise in Abessinien* (2 vols., 1838-'40); *Neue Wirbelthiere zur Fauna von Abessinien* (1835-'40); and *Uebersicht der Vögel Nord- und Ost-Afrikas* (1845).

RUPTURE. See HERNIA.

RURIK. See RUSSIA.

RUSA. See DEER.

RUSCHENBERGER, WILLIAM S. W., M.D., an American naturalist and author, born in Cumberland co., N. J., Sept. 4, 1807. He was educated in New York and Philadelphia, studied medicine, became a surgeon in the United States navy, and between 1826 and 1834 made two voyages of about 8 years each in the Pacific. In March, 1835, he sailed as surgeon of the fleet for the East India squadron, and returned in Nov. 1837, after a voyage of circumnavigation. From 1843 to 1847 he had charge of the U. S. naval hospital at Brooklyn, N. Y., and during that period organized the naval laboratory for supplying the service with unadulterated drugs. In 1848 he went again to the East Indies, and returning in the following year was made a member of the board appointed to draw up plans and regulations for the U. S. naval academy. In Oct. 1854, he sailed as surgeon of the Pacific squadron. His chief works are: "Three Years in the Pacific" (8vo., Philadelphia, 1834); "A Voyage round the World, including an Embassy to Muscat and Siam" (8vo., 1838); "Elements of Natural History" (2 vols. 12mo., 1850), published also in separate manuals on anatomy and physiology, mammalogy, ornithology, herpetology and ichthyology, conchology, entomology, botany, and geology; "A Lexicon of Terms used in Natural History" (12mo., 1850); and "Notes and Commentaries during a Voyage to Brazil and China in the Year 1848" (8vo., Richmond, 1854).

RUSH (*juncus*, Linn.; Lat. *jungo*, to join or bind, the rush being used for tying), the name of several plants belonging to the natural order *juncaceæ*. They are grass-like herbs with jointed stems, either leafless or bearing terete and laterally flattened, knotted leaves, and greenish or brownish flowers, consisting of regular, persistent perianths of 6 husk-like sepals, enclosing 3 to 6 stamens with introrsed anthers, a 1-styled, 1 to 3-celled ovary, forming a 3-valved, 3 or many-seeded pod. Structurally the flowers of the rushes are liliaceous, but in general aspect and texture grass-like. The common rush (*J. effusus*, Linn.) has a perennial root, a leafless, often sterile stem filled with a spongy pith, and flowers in panicles, much and diffusely branched, produced from the side of the stem (scape) above the middle. It is found throughout the United States in moist meadows and low grounds, and occupies and almost covers rice fields as soon as they are thrown out of cultivation. The bayonet rush (*J. militaris*,

Bigelow) is a very conspicuous plant, springing from a perennial root in the edges of ponds, with a culm 2 to 3 feet high, bearing a single, erect, cylindrical, jointed leaf, which overtops the stem, its panicle terminal, erect, heads numerous, with 5 to 10 flowers, and sepals acute, brown, edged with green. It occurs in eastern Massachusetts, on the pine barrens of New Jersey, and southward. A valuable species is the black grass (*J. bulbosus*, Linn.), with simple, somewhat flattened culms, slender, 1 to 2 feet high, leafy below; panicle somewhat cymose and rather crowded, usually shorter than the bracteal leaf; fruit triangular, obtuse, and mucronate. The variety *Gerardi* is the most common form in this country, and is considered the best product of the salt marshes. For hay it should be cut early, and when well cured is much esteemed for winter and spring fodder. The slender rush is a small hardy species, common on hard trodden footpaths and by shady roadsides; its stem is roundish, leafy at base, leaves slender, channelled above, florets in a terminal corymb; it is the *J. tenuis* of Willdenow. A smaller species, *J. trifidus* (Linn.), has densely tufted stems springing from matted, creeping rootstocks, a few thread-like leaves, a sessile head of 2 to 4 flowers, and brown pods with roundish seeds. It is found on the summits of mountains in New England and New York, and in the high latitudes northward.—The number of species of *juncus* found in the United States is about 20, of little utility, some indeed proving troublesome weeds in agriculture. A few, however, are more valued in Europe, such as the Dutch rush (*J. acutus*) and the sea rush (*J. maritimus*), which are planted on the sea embankments to render them firm by means of the matting together of their roots in the sand; and formerly the several species were used to cover floors instead of carpets, also in making mats, baskets, chair bottoms, and brooms; the pith of the common or soft rush served for the wicks of rush lights.—Some of the *cyperaceae* or sedges are sometimes called rushes, such as the *scirpus* or bulrush, and the club rush, horned rush, nut rush, &c. A tropical order, the *restiaceae*, allied to the true rushes, embraces many tough juncaceous plants, known as rope grasses, and used instead of twine; or they are twisted into ropes, or employed for a durable thatching, of which the several species of *restia* from the cape of Good Hope are examples.

RUSH, a S. E. co. of Ind., drained by Blue river and Flat Rock creek; area, 410 sq. m.; pop. in 1860, 16,201. It has an undulating surface and a fertile soil. The productions in 1850 were 1,685,994 bushels of Indian corn, 138,478 of wheat, 64,203 of oats, 6,520 tons of hay, and 69,531 lbs. of wool. There were 18 saw mills, 2 tanneries, 2 newspaper offices, 68 churches, and 1,378 pupils attending public schools. Capital, Rushville.

RUSH, BENJAMIN, an American physician, signer of the declaration of independence, born

on Poqueston creek, near Philadelphia, Dec. 24, 1745, died in Philadelphia, April 19, 1813. He was graduated at Princeton college in 1760, and studied medicine in Philadelphia, Edinburgh, London, and Paris. In Aug. 1769, he began the practice of his profession in Philadelphia, and was immediately elected professor of chemistry in the medical college of that city. In 1770 he made himself known as an author, and for many years wrote and published a great deal on various subjects, chiefly medical, but including also literary, philosophical, moral, and political topics. He embraced the patriot cause from the very first. In the provincial conference of Pennsylvania he moved the resolution to express in form its sentiments on the subject of a declaration of independence. A committee was appointed, of which he was chairman, to consider the question whether it had become expedient for congress to declare independence; the committee reported affirmatively, and the resolution was adopted unanimously, and presented to congress a few days only before the declaration of independence. When congress had decided on taking that step, 5 members from Pennsylvania withdrew, whereupon Rush and 4 others were elected to fill their places. The same year (1776) he was married to Julia Stockton, daughter of Richard Stockton, of New Jersey, also a signer of the declaration of independence. In April, 1777, he was made surgeon-general of the army for the middle department, and in July, 1777, physician-general. While engaged in the discharge of his duties, he found time to write 4 letters to the people of Pennsylvania on their constitution of 1776, which he censured as being very defective, especially in giving the legislative power to a single house, and which was soon after superseded by a new form of government, established by a general convention of the people. In Feb. 1778, he resigned his position as physician-general to the army, on account of the wrongs done to the soldiers in regard to the hospital stores. Returning to Philadelphia, he resumed the practice of his profession. About 1785 he planned the Philadelphia dispensary, the first institution of the kind in the United States. He was a member of the state convention which ratified the federal constitution, of which he was a strong supporter. He was also chosen a member of the convention of Pennsylvania to form a state constitution, and exerted himself to have incorporated in it his views in respect to a penal code and public schools, upon which he had previously written several essays. After this he took leave of political life. In 1789 he was made professor of the theory and practice of medicine in the Philadelphia medical college; and when in 1791 that institution was merged in the university, he was assigned the chair of the institutes and clinical medicine, and in 1797 filled the chair of clinical practice also, though not formally elected until 1805; and to the time of his death he discharged the duties of

his three professorships. In 1793 the yellow fever broke out in Philadelphia with great malignity, and desolated the city. It raged for about 100 days, extending from July till November, during which time the deaths amounted to upward of 4,000. The other physicians were entirely unsuccessful, until Rush treated the disease, and subdued it, by purging and bleeding, following up his practice with great perseverance, boldness, and success. It was afterward estimated by Dr. Ramsay of South Carolina, in his eulogium on Dr. Rush before the medical society of that state, that not fewer than 6,000 of the inhabitants of Philadelphia were saved from death by this treatment in the autumn of 1793. At one time Dr. Rush visited and prescribed for upward of 100 patients in a single day. For many weeks he seldom ate without prescribing for numbers as he sat at table, while at such times his house was filled with patients, chiefly the poor, waiting for advice. The new practice met with fierce opposition, which was aggravated by the assertion of Rush that the disease had not been imported, but had been generated at home. The medical war thus aroused continued for some time, and subsequently, in a paper called "Peter Porcupine's Gazette," edited by William Cobbett, assaults were constantly made upon him and his treatment of the disease, which were carried to such an extent that a suit was brought against Cobbett, and the jury rendered a verdict against him of \$5,000 damages. In 1805 Rush received from the king of Prussia a coronation medal for his replies to certain questions addressed to him in regard to yellow fever; for a similar reason he received the thanks of the king of Spain, and in 1807 was presented with a gold medal by the queen of Etruria as a mark of respect. In 1811 the emperor of Russia sent him a token of his admiration for his medical character. He was appointed treasurer of the U. S. mint in 1779, and held that office until his death. His writings are exceedingly voluminous. Between the years 1789 and 1804 he published 5 volumes under the title of "Medical Inquiries and Observations," which have often been reprinted. In 1798 his literary, moral, and philosophical essays were collected into a volume, of which a revised edition appeared in 1806. In 1812 he published a work upon the "Diseases of the Mind." His "Medical Tracts," containing a variety of essays upon health, temperance, exercise, &c., appeared in a separate volume at an early period of his life. He had the highest reverence for the Holy Scriptures, and was equally distinguished for his piety as for his learning. In 1791 he wrote an able defence of the use of the Bible as a school book. He was vice-president, until his death, of the Philadelphia Bible society, of which he was one of the earliest originators, and the constitution of which he drafted. Had his life been prolonged, he contemplated, as the employment of his declining years, a work to have been called "The Medicine of the Bible,"

for which he had made a good deal of preparation.—RICHARD, an American statesman and diplomatist, son of the preceding, born in Philadelphia, Aug. 29, 1780, died there, July 30, 1859. He was graduated at Princeton college in 1797, studied law in Philadelphia, and was appointed attorney-general of Pennsylvania in 1811 by Governor Snyder, and soon after comptroller of the U. S. treasury by President Madison. He then removed to Washington, and from 1814 to 1817 was attorney-general of the United States. In 1817 he was temporary secretary of state under President Monroe, and was then by him appointed minister to England, where he remained till 1825, negotiating during the period several important treaties, especially that of 1818 with Lord Oastlereagh respecting our fisheries, north-western boundary line, conflicting claims beyond the Rocky mountains, and the slaves of American citizens carried off in British ships contrary to the treaty of Ghent. His fortunate adjustment of the threatening question growing out of the execution by Gen. Jackson of the two British subjects Arbuthnot and Ambrister, was said to have been in a great measure influenced by the personal esteem in which the American minister was held by the British cabinet, and their confidence in his representation of the case. In 1825 President Adams recalled him from England, and made him a member of his cabinet as secretary of the treasury. In 1828 he was a candidate for the vice-presidency on the same ticket with President Adams, who was nominated for reelection, and received the same number of electoral votes. In 1829 he went to Holland to procure a loan for the corporations of Washington, Georgetown, and Alexandria, which he negotiated on advantageous terms. In 1836 President Jackson appointed him commissioner to obtain the Smithsonian legacy (see SMITHSON, JAMES), then in the English court of chancery; he was successful, and in Aug. 1838 returned with the entire amount, \$515,169. In 1847 President Polk appointed him minister to France. Here he acted a conspicuous part as minister of the United States on the breaking out of the revolution in Feb. 1848, which led to the sudden dethronement of Louis Philippe. He was the first of the foreign ministers at the French court to recognize the new republic, in advance of instructions from his government. At the close of President Polk's term he asked to be recalled, and spent the rest of his life in retirement. While a member of President Madison's cabinet, Mr. Rush wrote frequently and vigorously for the newspapers in defence of the war with England, of which he was a firm supporter. In 1815 he compiled an edition of the laws of the United States; in 1833 he published "Memoranda of a Residence at the Court of St. James," which passed through two editions in this country and in England; and in 1845 a second volume of the same work, "comprising Incidents, Official and Personal, from 1819 to 1825;

among the former, *Negotiations on the Oregon Territory.* In 1857 he published "Washington in Domestic Life." His sons published in 1860 a volume of his "Occasional Productions, Political, Diplomatic, and Miscellaneous, including a Glance at the Court and Government of Louis Philippe and the French Revolution of 1848, while the Author resided as Envoy Extraordinary and Minister Plenipotentiary from the United States at Paris."

RUSHWORTH, JOHN, the compiler of the papers known as "Rushworth's Collection," born in Northumberland, England, about 1607, died in London in 1690. He studied for a short time at Oxford, then at Lincoln's Inn, and was called to the bar, but never practised. As early as the year 1630 he began to attend in the star chamber, the court of honor, the exchequer chamber, and other places, wherever any matter of importance was in question, and to take notes of the proceedings. He attended also the meetings of the parliament of 1640, and took notes of the speeches of the king and members; and when the long parliament met, he was appointed assistant clerk to the house of commons. At this time also he took down "in character, or some description of short-hand, whatever was said in parliament that seemed most important." Subsequently Rushworth became the regular messenger between the house and the king, and also between the house and their general, Essex. In 1645 he was appointed secretary to Sir Thomas Fairfax, commander of the parliamentary forces, and from this time was principally with the army until Fairfax resigned in 1650. He then returned to London, and in 1652 was appointed one of the committee to deliberate on the reform of the common law. He sat in Richard Cromwell's parliament in 1658 for Berwick-upon-Tweed, and was re-elected by the same town in 1660, 1678, and 1679. When Sir Orlando Bridgeman was made keeper of the great seal in 1677, he appointed Rushworth his secretary. He was a member of the parliament convened at Oxford, and from 1681 lived in retirement. In 1684 he was arrested for debt and committed to prison, where he lingered for 6 years and died in a miserable condition. The first part (1 vol. fol.) of his "Historical Collection of Private Passages of State, Weighty Matters in Law, and Remarkable Proceedings in Parliament," was published in 1659; the second part and the "Trial of the Earl of Strafford" appeared in 1680, and the other parts of the collection were left ready for the press at his death.

RUSK, an E. co. of Texas, bordered N. by the Sabine river, and watered in the N. by its branches and in the S. and W. by those of the Angelina; pop. in 1860, 15,808, of whom 6,132 were slaves. In 1850 it had 2 saw mills, 2 tanneries, 3 newspaper offices, 6 churches, and 117 pupils in public schools. Capital, Henderson.

RUSKIN, JOHN, an English author, born in London in Feb. 1819. He is the son of a London merchant, and was graduated in 1842 at

Christchurch college, Oxford, having in 1836 gained the Newdigate prize for English poetry. Immediately afterward he devoted himself to the study of art, and to water color painting, in which he had already attained some proficiency. Becoming familiar with the works of Turner, he conceived that the merits of that painter were not sufficiently appreciated, and commenced a review article on the subject, which was gradually expanded into an 8vo. volume, published in 1843 under the title of "Modern Painters: their Superiority in the Art of Landscape Painting to all the Ancient Masters. By a Graduate of Oxford." It attracted attention from the rhetorical brilliancy of its style, the eloquence of its descriptive passages, and particularly from the summary manner in which the most distinguished landscape painters of the old and new schools were disposed of, and the claims of Turner to supremacy advocated. The paradoxical views of the author prevented it from becoming an authority, and among critics and connoisseurs its reception was generally hostile and even contemptuous. It gained hosts of admirers and disciples nevertheless, and in 1846 was republished for the second time in a greatly enlarged form, accompanied by a second volume treating "Of the Imaginative and Theoretic Faculties," to which, after an interval of 10 years, a 3d and 4th were added; and in 1860 the work was completed by a 5th volume. At the time of the publication of the last volume the original title had become a misnomer, the work being for the most part a philosophical treatise on landscape painting written from the author's peculiar point of view, and very discursive in its general character and treatment. The collection of materials for this work involved long visits to various parts of continental Europe, and in the cities of Italy, especially in Venice, the contemplation of the more striking mediæval buildings inspired Ruskin with the idea of attempting a reform in domestic architecture. The result was his "Seven Lamps of Architecture" (8vo., 1849), and "The Stones of Venice" (3 vols., 1851-'3), both works being illustrated by engravings from careful drawings by himself. In 1851 he also commenced the publication of a series of "Examples of the Architecture of Venice," from his own designs, of which but 3 parts appeared. Among his other architectural publications are: "Notes on the Construction of Sheep-folds" (1851); "Lectures on Architecture and Painting," delivered at Edinburgh (8vo., 1854); and a pamphlet entitled "The Opening of the Crystal Palace, considered in some of its Relations to the Prospects of Art," which is mainly devoted to a scheme for the preservation of Gothic buildings and works of art. The pre-Raphaelite movement in the British school of painting early enlisted the sympathy of Mr. Ruskin, who alleged that the principles on which Hunt, Millais, and their followers proceeded had first been enunciated in his own works; and in his pamphlet, "Pre-



**Raphaelitism**" (1851), his "Notes" on the royal academy exhibitions of 1855-'60, and in contributions to the newspapers and passages scattered through his writings, he has recorded in characteristic terms his admiration of the productions of the new school. In his "Notes" on Turner's pictures and drawings exhibited in Marlborough house, published in 1857, he astonished the public by severe strictures on Turner. His remaining works are: "The King of the Golden River," a Christmas fairy tale (1851); a notice of "Giotto and his Works," prepared for a collection of engraved outlines of the frescoes of that master, published by the Arundel society, of which Ruskin was one of the founders; "Elements of Drawing, in three Letters for Beginners" (1857), one of his most practical and useful treatises; "The Political Economy of Art" (1858); "Elements of Perspective;" and "The Two Paths," being the substance of lectures on art and its application to decoration and manufacture, delivered to London artisans in 1854. If to these be added his articles in the "Quarterly Review" on Lord Lindsay's "Christian Art" and Eastlake's "History of Oil Painting," his biographical notice of Samuel Prout in the "Art Journal" of 1849, his letters to the "Times" newspaper, and other fugitive pieces, we shall have a complete list of his works. He is still assiduously engaged in the study of art, and has at various times directed classes in the working men's college of London, and assisted other institutions, beside giving many friendly services to students in the theory and practice of art.

**RUSS, JOHN DENISON, M.D.,** an American physician, born at Chebacco (now Essex), Mass., Sept. 1, 1801. He was graduated at Yale college in 1823, studied medicine at Boston, New Haven, Paris, London, Edinburgh, and Dublin, and began to practise in New York in 1826. In 1827 he was appointed almoner of the supplies sent to Greece from Boston, and sailed in June of that year for Greece, with a cargo of provisions. He remained there 3 years, distributing the supplies received and superintending for 15 months a hospital which he established at Poros, and returned to New York in 1830. On March 15, 1832, he commenced at his own expense the instruction of 3 blind boys, and on May 19 added 3 more to the number. Soon after he was invited to organize the New England asylum for the blind at Boston, which had been chartered in 1829; but as he declined, Dr. S. G. Howe received the appointment. Dr. Russ was appointed superintendent of the New York blind institution in March, 1832; and being desirous of rendering his pupils capable of self-support, he familiarized himself with such trades as basket making, mat making, and carpet weaving, and instructed them in these. Finding that the alphabet, maps, and figures in use in European institutions were very cumbersome and expensive, he invented a phonetic alphabet of 41 characters, sufficiently like those of the Roman alphabet to be read

with little difficulty by seeing persons, to which he added 22 prefixes, suffixes, &c., and proposed to print books for the blind in raised type of these characters. He also greatly simplified the mathematical characters for the blind, using only 4 instead of 10, and printed maps for them from raised designs, using wave lines for water, &c., instead of the plan of marking the boundaries by a cord, as then in vogue. The maps, with some slight change, are still in use; but Braille's process (see **BLIND**) has superseded his figures, and his connection with the blind institution was terminated too soon to admit the general introduction of his phonetic system of writing. He was active in the organization of the New York prison association, and was for several years its secretary, serving also gratuitously for 5 years as its agent for investigating cases of detention, and subsequently was one of its vice-presidents. He also took an active part in bringing about the reform in the penitentiary at Blackwell's island, and the erection of the new workhouse. In 1849 he prepared a petition to the legislature, requesting it to make some provision for the proper training of vagrant children; and in 1851 the juvenile asylum was incorporated, Dr. Russ being appointed the superintendent, which position he held till the autumn of 1858, when he resigned, and has since that time resided in Brooklyn. Dr. Russ has been an active coöperator in other charitable institutions of New York and its vicinity; among them, an employment house for unfortunate poor women, designed especially for those who were desirous of reforming from a vicious or intemperate life; this institution was successfully established in 1850, under the superintendence of his wife and daughter.

**RUSSELL. I.** A S. W. co. of Va., bordered N. W. by the Cumberland mountains, which separate it from Kentucky, and S. E. by the Clinch mountains, intersected by Clinch river, and drained by the head waters of the West fork of Sandy river; area, about 1,300 sq. m.; pop. in 1860, 10,180, of whom 1,099 were slaves. It has a mountainous surface and some good soil in the valleys. It contains iron ore, coal, and marble. In 1850 there were 2 grist mills, 5 tanneries, 14 churches, and 517 pupils attending public schools. Value of real estate in 1856, \$1,536,447, showing an increase of 57 per cent. since 1850. Capital, Lebanon. **II.** An E. co. of Ala., separated from Ga. by the Chattahoochee, and drained by the Uchee, Wacoochee, and Cowekee creeks; area, about 900 sq. m.; pop. in 1860, 26,593, of whom 15,638 were slaves. In 1850 there were 26 churches, and 600 pupils attending public schools. The N. W. corner is traversed by the Montgomery and West Point railroad, connecting with the Columbus and Opelika railroad, which crosses the county toward the S. E. The Mobile and Girard railroad, not yet (1861) completed, also intersects it. Capital, Crawford. **III.** A S. co. of Ky., intersected by Cumberland river, and drained by its branches;

area, about 225 sq. m.; pop. in 1860, 5,453, of whom 559 were slaves. It has a hilly surface, and the soil is fertile near the streams. The productions in 1850 were 316,165 bushels of Indian corn, 51,416 of oats, 12,133 lbs. of wool, and 40,757 of tobacco. There were 12 churches, and 863 pupils in public schools. Capital, Jamestown.

**RUSSELL, BENJAMIN**, an American journalist, born in Boston, Mass., in Sept. 1761, died there, Jan. 4, 1845. He was apprenticed at 11 years of age to Isaiah Thomas, a printer of Worcester, Mass., and editor of the "Massachusetts Spy," and before completing his term enlisted in the revolutionary army. At the expiration of his apprenticeship he settled in Boston, and in March, 1784, established the "Columbian Centinel," a semi-weekly newspaper, which under his control was for 40 years one of the most influential organs of the federal party in New England. He repeatedly represented Boston in both branches of the state legislature, was for one or two terms a member of the executive council, and held a major's commission in the state militia, whence he was universally known as Major Russell.

**RUSSELL, EARL.** See **RUSSELL, LORD JOHN.**

**RUSSELL, LORD JOHN**, 8d son of the 6th duke of Bedford, an English statesman, born in London, Aug. 19, 1792. After passing some time at a public school at Sunbury, he was sent to the university of Edinburgh, the professorial chairs of that institution being then filled by men of great eminence, whose opinions were in unison with those liberal political principles, the support of which has for several generations distinguished the house of Russell. He took part in the discussions of the speculative society, and at the house of Dugald Stewart enjoyed the opportunity of intercourse with many of the leading minds of Britain. He went abroad in 1809, and travelled in Spain and Portugal, the English being at that time shut out from most of the continental countries through the power and influence of Napoleon; and he was an eye-witness of some of the most important incidents of the peninsular war. In 1813 he was chosen a member of the house of commons for the borough of Tavistock, in which the influence of his family was paramount. At that time the whig party was at the lowest point of its fortunes, and apparently was banished for ever from power. Lord John supported its principles, and the Liverpool-Castlereagh ministry found in him an uncompromising opponent; but so useless did all opposition appear, that he contemplated a withdrawal from political life. At the close of 1819 he began his career as a parliamentary reformer, making his first motion on the subject Dec. 14, 1819; and though defeated, he renewed the motion from year to year, with some exceptions. He succeeded, however, in getting the franchise transferred from a convicted borough to Yorkshire, which was an important admission by parliament. He sup-

ported Catholic emancipation, the repeal of the test and corporation acts, and retrenchment; and was a warm opponent of the bill of pains and penalties brought against Queen Caroline. He did not take office under Mr. Canning, but refrained from pressing his peculiar motions during his ministry, because of its general liberality. In 1828 he carried the repeal of the test and corporation acts through parliament, and in 1829 voted for the successful Catholic emancipation act. In the Grey ministry, formed in Nov. 1830, Lord John was paymaster of the forces, and took the lead in the house of commons in support of the reform bill, which he introduced in March, 1831. The reform bill, with some changes, was carried, and Lord John was chosen member for South Devon in 1832. He went out with the Melbourne ministry in 1834; but in 1835 he returned to office, being then appointed secretary of state for the home department, which place he held until 1839, when he became secretary of state for war and the colonies. During the 6 years that followed Lord Melbourne's restoration to power, Lord John Russell was really the chief member of the ministry; and he vigorously carried various reform measures, though the whigs had not a constant majority in the commons, and there was a majority against them in the house of peers. He ceased to be minister Aug. 30, 1841, when the second Peel ministry succeeded to that of Melbourne. For 5 years he was chief of the opposition, but in 1846, on the breaking up of the tory party, he became prime minister, holding the office of first lord of the treasury. His ministry lasted until 1852, when he was defeated on the militia question, and resigned. When the Aberdeen ministry was formed, at the close of 1852, he became secretary of state for foreign affairs, which office he soon exchanged for that of lord president of the council. He left the Aberdeen ministry in Jan. 1855, and shortly afterward took the office of colonial secretary in the Palmerston ministry. He was sent as British plenipotentiary to take part in the Vienna conference, which was intended to put an end to the Russian war; but his conduct in the conference not being approved by the English public, he withdrew from the cabinet, July 16, 1855. In 1859 he was appointed secretary of state for foreign affairs, which office he held for about two years. In July, 1861, he was elevated to the house of peers with the title of Earl Russell of Kingston-Russell. He has been a voluminous author, having published "Life of William Lord Russell" (1815); "History of the British Constitution" (1821); "Don Carlos, a Drama" (1822); "History of the Affairs of Europe since the Peace of Utrecht" (1824); "Correspondence of John, 4th Duke of Bedford" (1843); "Memoirs, Journal, and Correspondence of Thomas Moore" (1853-'6); and "Memorials and Correspondence of Charles James Fox" (1854). He has been twice married: in 1831 to Adelaide, widow of Lord Ribblesdale,

and in 1841 to Lady Frances Anna Maria, daughter of the earl of Minto. By both marriages he has children.

RUSSELL, WILLIAM, lord, 2d son of William, 5th earl of Bedford, an English statesman, born Sept. 29, 1639, beheaded July 21, 1688. After studying at Cambridge with his elder brother, he travelled in company with him on the continent, returning to England in 1659. He was elected to parliament for Tavistock in 1661, but for 12 years was a silent and inactive member. He partook of the dissolute pleasures of the court of Charles II., and was engaged in more than one duel. In 1669 he married Lady Vaughan, a widow, and daughter of the earl of Southampton, first lord treasurer to Charles II. He became one of the leaders of "the country party" in 1673, and served it faithfully till his death, coming forward in opposition to the unconstitutional and impolitic attempts of the king and his partisans to destroy English freedom through the aid of France. On the death of his elder brother, without heirs, at the beginning of 1678, he became Lord Russell, and heir apparent to the earldom of Bedford. On March 14, 1678, he seconded the motion to declare war against France, and spoke in support of it. At that time he had interviews with M. de Rouvigny, uncle of his wife, who had been sent to England by Louis XIV. to influence English parties so to act as to promote the interests of France; but nothing that then took place was illegal or improper, his object being to ascertain the nature of the connection between the king of France and the king of England. He acted with his party at the time of the "popish plot;" and as his sincerity cannot be doubted, his intellect has necessarily suffered in the estimation of succeeding times. In Nov. 1678, he was chosen to move in the house of commons that the duke of York should be removed from the king's presence and councils. He was one of the chief actors in the impeachment of the lord treasurer Danby, but afterward admitted that he was mistaken in the part he took against that statesman. When the new council proposed by Sir W. Temple was formed, Lord Russell was appointed one of the 30 members. He was not at first in favor of excluding the duke of York from the succession, but finally supported the measure. He left the council at the beginning of 1680. On Oct. 26 he spoke in favor of measures against "popery, and to prevent a popish successor" to the crown; and a week later he seconded Col. Titus's motion to disable the duke of York from becoming king of England. His influence in the house of commons was one of the causes of the passage of the exclusion bill through that body; but it was thrown out by the peers. The story that Lord Russell objected to the mitigation of the sentence of Lord Stafford rests on very doubtful authority. When the reaction against the whigs took place, the government of Charles II. resolved to destroy their leaders, proceeding to do so according to the forms of law. That was an age of "plots," and false witnesses abounded and could be procured as well by purchase as by threats. The state trials were farces, except that they furnished the machinery by which the blood of the accused could be shed, whether he were innocent or guilty. As the whigs had made use of the courts to murder innocent Catholics, so were they employed by the Tories to murder innocent Whigs. Lord Russell knew that it was meant to destroy him, but he would not fly. "He was very sensible he should fall a sacrifice," he said; "arbitrary government could not be set up in England without wading through his blood." He was arrested on the charge of having been concerned in the Rye House plot, said to have been formed by Rumbold and others, for an attack on the king and the duke of York. When taken before the council, the king told him that nobody suspected him of any design against his person, but that he had good evidence of his being in designs against his government. After the examination was over, Lord Russell was committed to the tower. He saw that he was going to his death, and to the remark of his servant that he hoped it would not be in the power of his enemies to take his life, he answered: "Yes, the devil is loose." From that moment he began to prepare for death, as if he were already under sentence. His arrest caused much sensation, and the duke of Monmouth, who was involved in the same charge, sent to let him know he would come in and share his fate, if he thought it could do him any service; but Lord Russell replied that it would be of no advantage to him to have his friends die with him. He replied civilly to the inquiries of a committee of the privy council, but declined to make any defence till his trial. The trial took place at the Old Bailey, July 13, 1688. The charge against him was "for conspiring the death of the king, and consulting and agreeing to stir up insurrection; and to that end to seize the guards (appointed) for the preservation of the king's person." The case for the government was conducted by Sir Robert Sawyer, attorney-general, Heneage Finch, solicitor-general, and Jeffreys; and their names are sufficient to show how it was conducted, and with what illegality and brutality it was marked. No counsel was then allowed to the accused, except on points of law, but Lady Russell was permitted to assist her husband in writing, "to help his memory." The jury was formed in violation of law, and it is certain that he was not guilty of the crime of which he was accused according to a proper construction of the act of 25 Edward III.; so that the act of 1 William and Mary, reversing his attainder, declared that he "was, by undue and illegal return of jurors, having been refused his lawful challenge to the said jurors for want of freehold, and by partial and unjust constructions of law, wrongfully convicted, attainted, and executed for high treason." The chief witnesses against him were

Col. Rumsey, Lord Howard of Escrick, and Mr. Sheppard, all of whom were renegades, and engaged in swearing away an innocent man's life in order to save their own lives. Howard was the most infamous creature of even that age; Sheppard contradicted himself; and Rumsey subsequently gave evidence on the trial of Mr. Cornish which, if true, proved that he had perjured himself at the trial of Lord Russell. The extent of Lord Russell's error was, that he had engaged in "some discourses about making some stir," such as were common enough with the whigs after it had become evident that the king had resolved to govern contrary to law; this was all that was sworn against him, and this was not treason. As to the Rye House plot, if any such plot ever was formed, which is scarcely to be believed in view of the dying declaration of so bold and honest a man as Rumbold, it is not now pretended that Lord Russell had any part in it; but the hatred which the details of that plot, as published, excited against him, aided to bring about his conviction. He introduced witnesses to show that Lord Howard had declared and protested that he knew nothing against him, nor of any plot he could in the least be questioned for. Other witnesses, of the highest character, were brought forward to speak to the general excellence of Lord Russell's character, which rendered it improbable that he should have entered into a conspiracy like that charged against him. One of them said: "I have been acquainted with my lord several years, and conversed much with him. I took him to be one of the best sons, one of the best fathers, and one of the best masters—one of the best husbands, one of the best friends, and one of the best Christians we had." Lord Russell made a short but strong speech to the court and jury; but the former charged against him, and the latter found him guilty. When brought up to receive sentence, on July 14, Lord Russell pointed out that judgment ought not to pass upon him for conspiring the death of the king, of which there was no proof by any one witness, all the witnesses having sworn a conspiracy to levy war, but no intention of killing the king. He was answered, "that it was an exception proper to be made before the verdict; but that the court was now bound by the verdict, as well as the prisoner. Thus, in the state of the law at that time, the prisoner was unable to introduce counsel before the verdict, because that were admitting the fact; and he was excluded from arguing the point after the verdict, because the jury had given judgment on the fact and the law together." Yet in another case, that occurred in the following year, a contrary decision was made, which shows that it was the deliberate purpose of the government to put Lord Russell to death, by way of intimidating the liberal party, his rank, his influence, and his very innocence serving as evidences that no man could hold himself safe who should oppose the arbitrary schemes of the court. Sen-

tence of death was then passed upon Lord Russell, and the king commuted his punishment to simple decapitation, which was a favor always accorded to criminals of the aristocratic classes. Great efforts were made to save his life, and it was reported that his father offered £100,000 for a pardon, to which the king replied: "He could not purchase his own and his subjects' blood at so easy a rate." The king seems to have been impressed with the belief that he could not, with safety to his own life, spare the life of Lord Russell. To please his friends, and because of his wife's distress, Lord Russell petitioned the king and the duke of York to spare him, on condition of his living abroad, and taking no part in English affairs; but he never supposed his petition would be favorably received. He was attended by Burnet and Tillotson, but could not be brought to subscribe to their servile doctrine on the right of resistance to tyranny. Some of his observations during the few days that passed between his sentence and his murder show much pleasant humor, and others great depth of thought and eloquence. No man ever faced death with greater firmness. He fell asleep a second time on the morning of his execution, and refused to accept of a plan formed for his escape by the earl of Devonshire, then Lord Cavendish. At the scaffold he gave a paper to the sheriff that embodied his sentiments, and after the usual ceremonies submitted to the stroke of the executioner.—No man has a nobler place in English history than William Lord Russell, the conviction that he was judicially murdered heightening the effect of his personal virtues and his political services. His attainder was reversed immediately after the revolution, and his father was created duke of Bedford in 1694, the patent stating, among the reasons for conferring the honor, "that this was not the least, that he was the father to Lord Russell, the ornament of his age," &c.—RACHEL, Lady Russell, survived her husband more than 40 years, dying Sept. 29, 1723, at the age of 87. Her "Letters," edited by Miss Berry, were published in 1819; and a more perfect edition, edited by Lord John Russell, appeared in 1854. In the preface to the work, the editor says: "The recent historical work of Mr. Macaulay, splendid and powerful as it is, does not appear to me to give a correct account of the conduct of Lord Russell in the memorable transactions which led to his trial and condemnation. This is not the place to enter into that inquiry; if it were, it would not be difficult to show that, while Lord Shaftesbury and some of his friends were urging on resistance, Lord Russell was opposed to any attempt of the kind. Lady Russell says truly he was guilty of misprision of treason at most." "The Life of William Lord Russell, with some Account of the Times in which he lived" (2 vols. 8vo., London), by Lord John Russell, was published in 1815, and has since passed through several editions.

RUSSELL, WILLIAM, a Scottish historian, born in Selkirkshire in 1741, died in Dumfriesshire, Dec. 25, 1793. In 1756 he was bound apprentice for 5 years to a bookseller and printer of Edinburgh, and upon the completion of his apprenticeship published a "Select Collection of Modern Poems." In 1764 he relinquished his trade and repaired to London in search of literary employment. His principal works are: a "History of America" (1779); "History of Modern Europe" (5 vols., 1779-'84); "History of Ancient Europe, with a View of the Revolutions in Asia and Africa" (2 vols. 8vo., London, 1793); and "History of England from the Beginning of the Reign of George III. to the Conclusion of the American War," left unfinished at his death.

RUSSELL, WILLIAM, an American educationist, born in Glasgow, Scotland, April 28, 1798. He studied at the university of Glasgow, and in 1817 came to Savannah, Ga., where in 1819 he became the head of the Chatham academy. In 1822 he removed to Connecticut, and for 3 years presided over the New Township academy and the Hopkins grammar school at New Haven. From ill health he resigned his connection with the grammar school, and commenced giving instruction to classes in elocution in Andover, Cambridge, and Boston. In 1826 he took charge of the "American Journal of Education," edited it for 3 years, and then removed to Germantown, Penn., where he taught a limited class of young ladies for several years. He next opened a school for young ladies in Philadelphia, but finally resumed his classes in elocution in Andover and Boston, giving instruction also at teachers' institutes in Rhode Island and New Hampshire. In 1849 he established a seminary for teachers in New Hampshire, and in 1853 removed it to Lancaster, Mass., where he now resides. Mr. Russell has been largely engaged in the preparation of treatises on education and text books for schools, especially in the departments of reading and elocution.

RUSSELL, WILLIAM HOWARD, a British journalist, born in Dublin in 1821. He was entered at Trinity college, Dublin, in 1838, and while pursuing his studies there in 1841 was invited by an uncle, who was on the staff of the London "Times," to write a report of the Longford election for that journal. Russell, being then in narrow circumstances and partly dependent on his kinsman, the bishop of Meath, for the means of procuring his education, accepted the offer, and reported the proceedings at this and other Irish elections to the satisfaction of his employers. In the latter part of 1842 he quitted Trinity college and went to London; but failing to obtain at once the place of a reporter for the "Times," he took up his residence in Cambridge, where he supported himself by contributions to the periodicals, particularly the "Sporting Magazine," being well informed in matters pertaining to the field and rural life. In 1843 he obtained the

appointment of mathematical master in the Kensington grammar school, which however he held for a few months only. In 1843 he was sent by the proprietors of the "Times" to attend the monster repeal meetings in Ireland and write the descriptive reports of them, the speeches being reported by the regular shorthand writers; and the effective manner in which he performed the task procured him a permanent engagement. Subsequently he prepared an account of the condition of the O'Connell estates, corroborating the statements of Mr. Forster, the "Times commissioner," which had been impugned by the family. He also reported the O'Connell state trials in Feb. 1844. In 1845 he resigned his position on the staff of the "Times," expecting to obtain a more lucrative one on that of the London "Daily News," then about to be started by Dickens; but failing in this, he entered his name at the Middle Temple and accepted an engagement from the "Morning Chronicle." During a visit to Ireland in 1846-'7 to inquire into the distress caused by the potato disease, he was shot at near Tulla in County Kerry in mistake for a government agent, and narrowly escaped being killed. In 1847 he terminated his connection with the "Morning Chronicle," and returned to the "Times," to the staff of which he has since been permanently attached. His department included the chronicling of popular meetings or demonstrations, royal progresses, reviews, launches, and other striking public events, for which purpose he made occasional visits to the continent. In 1854 he was selected to accompany the British expedition to the Crimea as the special correspondent of the "Times," in which capacity he was present at nearly every important action from the battle of the Alma, Sept. 1854, to the final attack upon Sebastopol, Sept. 1855, returning with the bulk of the army at the conclusion of the war. On many occasions he performed his duties at considerable personal risk, and his descriptions of the progress of the siege, and of the sufferings of the troops and the inefficiency of the commissariat; excited a lively interest not only in England, but in continental Europe and the United States. His letters have been published in 2 vols. 8vo. under the title of "The War, from the Landing at Gallipoli to the Death of Lord Raglan" (London, 1855), and "The War, from the Death of Lord Raglan to the Peace at Paris" (1856); and he subsequently published in monthly parts "The Expedition to the Crimea, with Maps and Plans" (London, 1855). Soon after returning to England he attended the coronation of the emperor Alexander II. at Moscow; and at the close of 1857 departed for India, where he remained until 1859, sending to the "Times" accounts of the civil and military operations which led to the suppression of the sepoy rebellion. The substance of these was afterward published under the title of "My Diary in India." In March, 1861, he arrived in the United States, and after



that of American Russia, 10,723; grand total of the population of all Russia, 71,243,616. This does not include the half-independent tribes of the Caucasus (about 1,400,000 souls), and the independent tribes of American Russia (from 40,000 to 50,000), which, together with the population of the territory acquired since 1856, would swell the aggregate population to more than 73,000,000. The following statement of the results of former censuses is an evidence of the great rapidity with which the population of Russia has increased: 1722, 14,000,000; 1815, 45,000,000; 1835, 55,000,000; 1851, 65,220,000. The average annual increase of the population during recent years has been about  $1\frac{1}{2}$  per cent.; in several years it has been greatly checked by the effects of epidemics, and in 1848 the number of births was even less by 295,943 than of deaths. In population Russia does not tower so high above the other nations of the earth as in extent. In European Russia the average is about 30 to an English square mile; in Asiatic Russia, 1; in Russian America, only 1 to every 6 square miles.—There are 8 military governors-general, at St. Petersburg, Moscow, and Warsaw (formerly a 4th one at Riga), and 10 governors-general, several governments together forming the district of a governor-general, viz.: 1, South Russia; 2, Grodno and Kovno; 3, Podolia and Volhynia; 4, Eastern Siberia; 5, Kutais; 6, Western Siberia; 7, Livonia, Esthonia, and Courland; 8, Orenburg and Samara; 9, Caucasus; 10, Finland. Beside these there are 30 military and 54 civil governors. Every government or province is again subdivided into districts, usually from 10 to 12 in number. All the governors-general are superior officers of the army, and have the chief command over the troops distributed in the governments under their administration. They have to give regular accounts to the senate, but only the emperor can reprimand them. The largest cities of the empire are St. Petersburg, the capital; Moscow, the old capital, where the emperor is still crowned; Warsaw, Riga, Kishenev, Kiev, Saratov, Kasan, Toola, Berditchew, and Wilna. In 1856 there were 141 towns having each upward of 10,000 inhabitants, 43 having over 20,000, 10 having over 50,000, and 3 having over 100,000.—In the north, the empire in its entire extent from E. to W. is washed by the Arctic ocean; to the west it borders on the Baltic, to the south on the Black and Caspian seas; and by the recent acquisition of the Amoor region, its Asiatic possessions have extended considerably southward on the north Pacific. The Arctic ocean is of but little use for navigation, being mostly obstructed by ice, and the maritime trade of the empire has its chief emporiums on the Baltic, the Black and Caspian seas, and on the north Pacific. The northern coast is deeply penetrated by large arms of the Arctic ocean, forming a number of gulfs, of which the Kara (brown or hazel) sea, on the border of Europe and Asia, about 450 m. in length, and on the

N. W. the White sea, of about the same length, are the most important. Among the numerous promontories which are formed by the inlets of the sea is Cape Kanin, the extremity of the peninsula which separates the White sea from the Tcheskaya gulf.—The rivers of Russia are numerous and remarkable for their magnitude. Those of European Russia belong to 4 great basins, those of the Arctic ocean, the Baltic, the Black sea, and the Caspian sea. The great water-shed is formed by a broad central ridge, commencing on the frontiers of Poland, stretching across the empire in an irregular waving line, and terminating on the W. side of the Ural mountains. The waters N. of this shed fall into the Arctic and the Baltic sea, those S. of it into the Black or the Caspian sea. The Arctic ocean receives directly the Petchora, which rises in the Ural mountains, traverses the most solitary deserts of Russia, receives a number of tributaries, and discharges itself by a wide estuary, remarkable for the number of islands which the alluvial deposits of the river have formed within it. Through the White sea, the Arctic ocean receives the Mezen, which rises in the government of Vologda and is about 600 m. long; the Dwina, which is formed by the junction of the Sookhona and Vitchevga; and the Onega, which is the outlet of several lakes. On the declivity of the Baltic are the Tornea, originating in Swedish Lapland, and the Kemi, which fall into the gulf of Bothnia; the Neva, which is remarkable for the purity of its water, and the Narva, which fall into the gulf of Finland; the Döna and the Aa, which flow into the gulf of Riga; and the Niemen, which rises in the government of Minsk, and before terminating its course enters Prussia under the name of the Memel. The Vistula, whose source and mouth belong to Austria and Prussia, traverses Poland, and receives several tributaries, among which the North Bug, rising on the ridge between Volhynia and Podolia, is most important. To the basin of the Black sea belong the Pruth, an affluent of the Danube, and the Dniester (anc. Danaster), both rising in Galicia; the Dnieper (anc. Borysthenes), which rises in the government of Smolensk, receives a considerable number of affluents, among them the Beresina, and falls into the Black sea near Cherson; the Don (anc. Tanais), originating in the lake of Ivanovsko in the government of Toola, intersecting the Don Cossack country, and discharging itself into the sea of Azof; and the Kooban, which descends from the Caucasus, forms part of the boundary between Asia and Europe, and near its mouth separates into two branches, one of which falls into the sea of Azof and the other into the Black sea. The basin of the Caspian sea receives the Volga (anc. Rha), the largest river of Europe, which originates in a small lake in the government of Tver, traverses Lakes Oselok, Piana, and Volga, and discharges into the Caspian near Astrakhan; the Ural, which descends from the eastern declivity of the



mountains, traces out for some distance the frontier of Europe, and after a course of 1,000 m. falls into the Caspian near Guriev. A large portion of the area of Russia is occupied by lakes. The Caspian sea, being wholly surrounded by land, is really a lake, though on account of its extent it is called a sea. In European Russia, most of the lakes belong to the northern basins, as Lake Ladoga, the largest lake of Europe, and Lakes Onega, Peipus, and Ilmen. The government of Olonetz alone contains 2,000 lakes, and a still larger number is found in the grand duchy of Finland.—European Russia in general forms part of an immense plain, commencing in Holland, and extending over the north of Germany and the whole east of Europe. Only occasionally small table lands occur, as the Valdai hills in the governments of Moscow, Tver, and Tula, the loftiest summit of which is about 1,000 feet in height. To the N. W. some branches of the Scandinavian mountains enter the Russian territory, among which the Manselkåe is the most important. In the S. W. the Carpathian mountains send forth ramifications. To the S., in the peninsula of the Crimea, is the insulated chain of the Jaila mountains, which in one place attain an elevation of 5,185 feet. To the E. the Ural mountains, and to the S. E. the Caucasus, form in great part the frontier between Europe and Asia. The plains are covered either with bogs and swamps or with forests, and in other parts are dry and woodless tracts called steppes. The steppe region extends from the river Pruth, across the lower water courses of the Dniester, southern Bug, Dnieper, and Don, as far as the Volga and Caspian sea. It is only in the western and middle parts of this region that rich meadow land is met with; the rest is poorly watered, thinly populated, and, notwithstanding the occasional fertility of the soil, but little favorable to agriculture. What the steppes are to the south and east of Russia, the *toondras* in the governments of Olonetz and Archangel, mostly toward the shores of the Arctic ocean, are to the north. They are treeless wastes, bearing a scanty vegetation of low shrubs on a moss or turf surface.—The geological structure of European Russia is characterized by vastness and simplicity. Single formations are found to extend over entire kingdoms. In the northern part the granite and the permian formation, composed of grits, marls, conglomerates, and limestones, prevail; Esthonia and Ingria (in the government of St. Petersburg) present the silurian formation, resting on schistose rocks. Along the chain of the Ural mountains, beside the eruptive formations of the most ancient period, the silurian group prevails. Lithuania, which is a part of West Russia, and Poland belong almost wholly to the tertiary group; they also contain cretaceous rocks. The southern portion of European Russia belongs to the tertiary and granitic groups. The southern coast of the Crimea is of jurassic formation. In the Caucasian countries cretaceous

and jurassic rocks prevail, mixed with granite. —The soil differs very greatly in the different provinces. Some consist mostly of sandy barren plains or vast morasses. The most valuable portion of the empire is that south of the Valdai hills and of Moscow, extending on the E. to the Volga, and including the country of the Don as far as the sea of Azof and the frontier of the Crimea, and on the W. to the frontier of Galicia. All this region is rich wheat land, exporting wheat to Asia and Europe, through Odessa, Kertch, Taganrog, and Nikolaiev.—Almost the whole of European and three fourths of Asiatic Russia lie within the temperate zone. The southern border of the empire approaches to within 15° of the tropic zone, while the northern border extends 12° beyond the arctic circle. In general the climate is severe. The mean temperature of winter passes the freezing point even in the most southern districts. South of lat. 58° N. the mean temperature is between 40° and 55° F.; the winters are short and severe, and the summers long and hot. With lat. 58° the cold region begins, and with lat. 65° the arctic region. At St. Petersburg, which is within the former space, the thermometer in December and January sinks to 22° below zero, while in summer it rises to 85° or 90°. Among the most common atmospheric phenomena is the *buran*, a vehement wind accompanied by heavy falls of snow, sometimes overwhelming travellers and even caravans. The Tauric steppe is subject to violent snow storms, called *samet* or *touga*. In general, the climate is healthy; yet malignant fevers and a kind of scurvy prevail in the Crimea; in the Caucasian provinces there are various epidemic maladies; an affection of the scalp, called *plica*, shows itself frequently in the Ukraine (Little Russia) and Poland; southern Siberia is afflicted with the *yazva*, a large tumor of the skin produced by the sting of an imperceptible insect; and cretinism is frequent in the E. Siberian province of Yakootsk.—Although many portions of the empire in point of productiveness compare favorably with the most fruitful countries of Europe, agriculture is still at a very low stage. The wealth of the landed proprietor formerly consisted less in the extent of his land than in the number of serfs who were attached to it. The best cultivated land is to be found in the southern portion of the Baltic provinces, in the governments near Moscow, and in the kingdom of Poland; but even in these most favored provinces there are large tracts of land in which not  $\frac{1}{5}$  part of the surface is cultivated. According to Schnitzler, the entire surface of European Russia amounts to 1,085,671,490 acres, of which 421,200,000 are occupied by forests, 480,600,000 by uncultivated land, water, houses, and roads, 164,700,000 by arable land, and a little more than 16,200,000 by meadow land. The forests formerly constituted an inexhaustible source of riches, but from reckless administration they now produce comparatively little. The old three-field system of husbandry, by

which one third of the land is always in fallow, is still in general use; and in Great and Little Russia, owing to the depth of the soil, no manure is necessary. All the cereals are produced in such abundance as to meet not only the demand for home consumption, but leave a large surplus for export. Maize is chiefly grown in the countries about the Black sea; flax, hemp, and hops are of excellent quality; the potato is not yet grown in all parts of the empire. The cultivation of the beet root has been of late greatly advanced by means of prize medals, and a large number of sugar houses are already supplied by it. The total produce in 1858 was 18,503,907 cwt., valued at \$2,703,858. The culture of the vine in the Crimea, Bessarabia, and other provinces of S. Russia, has since 1825 furnished an average of 5,500,000 Russian quarts. Tobacco is grown on the Volga, in Little Russia, and on the Don, and yields about 9,500,000 lbs. annually. Horticulture, except in the vicinity of the great cities, is greatly neglected. The government makes great efforts to favor agriculture; many agricultural societies have been formed, and a number of schools established, which spread useful knowledge on the subject in all parts of the empire.—Horses are very numerous in Russia, and highly valued by all the inhabitants of the steppes, for many of whom horse flesh is the principal article of food. In the S. W. provinces the breed is superior. In general the horses of Russia are hardy and strong, but not so well taken care of as in other countries. The best studs are in the governments of Tambov, Kharkov, Voronej, and Kiev. The breeding of sheep is very extensive; the wool of the common Russian sheep is hard and coarse, but during the last 30 years the breeding of fine-wooled sheep has been steadily on the increase, especially in the Baltic provinces, in Poland, and in the southern governments. Hogs are most abundant in middle Russia, Lithuania, and White Russia, but are also reared in the south and in the Baltic provinces. The number of domestic animals in 1856 was as follows: horses, 18,571,283; asses, mules, &c., 26,348; horned cattle, 26,219,822; sheep, 52,161,032; stags, 432,842; swine, 9,753,800; camels, 59,837; goats, 1,694,129; total, 108,918,593. Of the sheep about 8,500,000 were of the fine-wooled sort, principally found in the governments of Ekaterinoslav (1,237,809), Taurida (982,013), and Voronej (947,553). Bee culture is most extensive in Poland, the Lithuanian provinces, and the governments on the Volga, especially Nijni Novgorod, Kasan, and Simbirsk, where the remains of the Finnish tribes make it their principal occupation. Altogether it yields annually about 5,410,000 lbs. of wax, and 16,230,000 of honey, and not only supplies the home consumption, but leaves considerable surplus for exportation. The culture of silkworms was introduced by Peter the Great, and has been especially developed in the government of Astrakhan and in the southern part of the Crimea. The southern

provinces in 1833 yielded 10,900 lbs. of silk, and Transcaucasia, in 1850, 721,000 lbs. Reindeer are kept N. of lat. 66° N., and camels in the south, many being found near Orenburg. Among the wild animals are the bison (in the forest of Bialovitza in Lithuania), elks, deer, bears, wild hogs, and gluttons; and in the steppes wolves, foxes, wild asses, saiga antelopes, konsak, and the jerboa. Furs are an important article of export. Fish is very abundant in the Polar sea and in the rivers, and some tribes, especially in the N. E., live entirely by fishing. The most important fisheries are those of the Volga, the Ural, and the sea of Azof. They are exempt from taxes, except those of the Volga. In the Polar sea, whales, seals, &c., are caught. —Nearly all the metals are found in Russia, most of them of excellent quality. The principal mines are in the Ural and Altai mountains, and near Nertchinsk in Siberia. The produce of gold increased from 18,900 lbs. avoirdupois in 1839 to 49,796 in 1845, and 65,700 in 1847, since which it has again decreased (in 1852 only 50,812 lbs.). The total produce of gold from the middle of the 18th century to 1853 is estimated at 873,651 lbs.; the value of the produce from 1819 to 1848 at \$168,820,000. Silver is also found in the Ural and Altai mountains, and the yearly produce amounts now to about 58,000 lbs., but recently discovered veins of argentiferous galena promise a larger yield. The aggregate value of the gold and silver produced from 1826 to 1851 amounted to \$215,789,000, and the aggregate value of the Russian gold and silver bullion in 1851 was \$261,000,000. Platinum is found almost exclusively in the neighborhood of Ekaterinburg. It was first discovered in 1823, from which year until 1851 the product was 74,326 lbs. Copper is found in the Ural, but much more copiously (though as yet but little worked) in E. Siberia. The produce was 3,555 tons (of 2,240 lbs.) in 1852, and 5,441 in 1857. Formerly the larger portion of it was exported, but more recently the exportation has decreased in consequence of English competition. The iron mines furnish a supply more than sufficient for the wants of the empire. The works in the Ural mountains alone are said to employ above 50,000 laborers. The total produce was 167,214 tons in 1852, and 205,822 in 1857. Rich coal mines have been discovered in nearly all parts of the empire, yet the annual product has not since 1850 exceeded 51,000 tons, of which 38,000 tons is anthracite. The country is very rich in salt and brine springs, the most important of which are in the government of Taurida, which alone furnishes annually about 258,000 tons, while the total produce is about 583,000. —Manufactures are increasing with wonderful rapidity. Their introduction into Russia began in the 15th century, but very little was done until the time of Peter the Great, who in this as in other respects became the founder of Russian prosperity. Catharine II., Alexander I., Nicholas I., and Alexander

II. have all distinguished themselves by zeal in encouraging manufactures. At the death of Peter the Great there were 21 large imperial manufactories, and several smaller ones; in 1801 their number had risen to 8,724, in 1812 to 2,332, in 1820 to 3,724, in 1837 to 6,450, in 1845 to 7,315, and in 1854 their number was estimated at 18,100. The chief seat of manufactures is Moscow, and next the governments of Vladimir, Nijni Novgorod, Saratov, and St. Petersburg, and Poland. Among the most important products of Russian industry are woollen goods, silk, cotton, linen of all kinds, leather, tallow, candles, soap, and metallic wares. Cotton spinning is rapidly developing under the prohibitive system; in 1860 about 200,000 bales of raw cotton were imported; while 50 spinning mills in 1850 yielded about 2,520,000 lbs. of yarn, not sufficient for the demand of the native looms, which in 300 manufactories produced about 8,000,000 pieces of cotton. The value of the latter was estimated in 1845 at \$34,000,000, of which \$18,850,000 belonged to the government of Vladimir. The manufacture of woollen goods is likewise rapidly gaining in extent. In 1822 the cloth for the uniforms of the imperial guards had to be obtained in England, and in 1823 Silesia and Poland furnished the supply for the Russian commerce in woollen goods with China; now Russian manufactories supply both. In 1850, 500 establishments manufactured 21,637,000 lbs. of sheep's wool, half of which was of fine quality. The manufacture of mixed woollen goods commenced in 1840, and in 1845 Moscow alone had 22 manufactories. Coats of sheepskin, the common dress of the lower classes of the population, are manufactured at the rate of about 15,000,000 annually. The chief seat of the silk manufacture is the government of Moscow. Altogether there are about 200 establishments manufacturing upward of 1,830,000 lbs. of raw silk. In 1845 the value of the annual production was estimated at \$5,278,000. In quality the goods are still inferior to those of other European countries, and the prices are higher. Russia has at present a larger number of beet sugar factories than any other country; in 1853 there were no fewer than 360, while France had 334, and the Zollverein 237.—The principal articles of export are corn and grain, tallow, hemp, flax, hemp and flax seed, hemp and linseed oils, iron, copper, timber, potashes, bristles, furs, hides, and isinglass. The principal imports are rice, raw and refined sugar, coffee, tea, wine, fruits, pearls and precious stones, books, engravings, and furs; cattle and horses from Asia; foreign manufactures of silk, wool, cotton, &c.; raw cotton, cotton yarn, indigo, cochineal, and dye woods. The seaports are few, being almost confined to Archangel on the Arctic ocean, St. Petersburg and Riga on the gulfs of the Baltic, Odessa, Nikolaiev, and a few others of less importance on the Black sea, Taganrog on the sea of Azof, Astrakhan, Bakoo, and Kizliar on the Caspian, and Nikolaiev at the mouth

of the Amoor, on the gulf of Tartary. The following tables show the principal articles of the foreign commerce for 1857-8:

## EXPORTS.

Articles.	1857.	1858.
Grain.....rubles	51,588,981	50,288,637
Wood....."	6,003,325	4,802,362
Hides....."	4,643,969	811,473
Leather....."	1,537,460	1,072,573
Flax.....poods	4,610,667	8,881,207
Tallow....."	8,503,594	8,636,207
Hemp....."	2,732,626	2,866,396
Iron....."	828,038	512,331
Copper....."	161,570	45,226
Wool....."	1,093,550	918,613
Potash....."	610,411	556,956
Linseed and hempseed....."	1,464,574	1,312,384

## IMPORTS.

Articles.	1857.	1858.
Sugar, raw.....poods	1,441,757	1,259,396
" refined....."	261,012	92,794
Oil of Provence....."	672,825	516,085
Coffee....."	295,760	314,271
Cotton....."	2,438,573	2,677,388
Cotton twist....."	884,803	282,679
Wool....."	167,100	160,098
Silk....."	14,821	15,348
Wines and other liquors.....rubles	9,088,066	9,896,180
Dyestuffs....."	8,909,884	8,427,689
Fruit....."	4,996,251	5,750,791
Machines and models....."	7,611,805	7,598,416
Cottons....."	7,380,419	7,274,909
Silk goods....."	7,169,966	6,923,874
Woollen stuffs....."	4,244,878	8,328,860
Linen stuffs....."	2,073,759	1,780,468

The following table gives the amount of Russian commerce with the different countries of the world for the year 1857:

European and American trade.	Imports, rubles.	Exports, rubles.
Sweden.....	260,076	2,511,500
Norway.....	1,830,806	653,545
Denmark.....	1,207,696	5,088,204
The Sound.....	.....	679,873
Prussia.....	25,860,660	17,796,478
Hanse towns.....	11,898,956	4,568,320
Holland.....	9,642,291	9,898,220
Belgium.....	1,855,782	2,337,703
Great Britain.....	88,884,147	72,274,412
France.....	9,163,878	14,275,852
Portugal.....	445,580	622,584
Spain.....	1,994,412	831,104
Sardinia.....	457,182	2,241,388
Tuscany.....	145,785	1,564,851
Papal States.....	.....	871
Kingdom of Naples.....	8,899,841	78,400
Austria.....	7,138,201	7,429,184
Ionian Islands.....	166,662	31,040
Greece.....	252,557	152,044
Turkey.....	8,482,944	8,868,436
United States.....	8,107,820	2,268,268
South America and the West Indies.....	220,077	.....
Other countries.....	679,148	251,091
Total.....	131,775,515	153,419,888
Asiatic trade.		
Asiatic Turkey.....	485,145	1,228,518
Persia.....	8,977,820	676,076
The Kirghiz steppes.....	8,068,187	2,666,623
Khiva.....	278,899	30,199
Bokhara.....	1,867,808	539,411
Tashkend.....	761,004	605,446
China.....	7,042,470	6,169,100
Other countries.....	1,883,565	.....
Total.....	19,847,184	11,945,671
Grand total.....	151,122,698	165,365,459

The following table gives in rubles the value of imports and exports from 1851 to 1858 :

Years.	All Russia.		Asiatic Russia	
	Exports.	Imports.	Exports.	Imports.
1851....	97,394,457	103,737,612	11,140,293	15,734,836
1852....	114,773,829	100,864,052	12,423,885	16,649,447
1853....	147,662,815	102,286,768	2,287,624	1,056,900
1854....	65,337,681	70,358,608	9,908,118	15,691,827
1855....	39,517,440	72,699,881	10,347,649	16,254,501
1856....	160,249,872	122,562,442	10,593,882	17,002,189
1857....	169,688,134	151,686,799	20,624,558	19,347,199
1858....	151,175,647	169,688,134	11,909,571	11,945,598

The above table shows that from 1851 to 1858 the value of imports as well as exports has constantly augmented, both for Asia and Europe, except the years 1854 and 1855, when there was a considerable falling off in consequence of the Turkish war. The imports and exports of gold and silver, in coin and bars, in 1858, were as follows :

	Imports.	Exports.
Europe.....	6,432,017	26,029,464
Asia.....	183,463	4,779,187

The movements of shipping in 1857 and 1858 were as follows :

Years.	Entered.		Cleared.	
	Vessels.	Tonnage.	Vessels.	Tonnage.
1857.....	8,583	867,413	9,086	941,053
1858.....	8,941	833,092	9,076	920,111

Among the entries in 1858 were 1,757 English vessels, 960 Russian, 940 Turkish, 685 Dutch, 628 Swedish, 529 Austrian, 494 Danish, and 2,948 of other nations. The condition of the Russian commercial fleet on Jan. 1, 1858, was as follows : sea-going vessels, 286, of 23,000½ lasts; coasters, 813, of 29,279½ lasts; total, 1,099 vessels of 52,280 lasts (equal to 104,560 tons). In this total are not included the vessels of the port of St. Petersburg, or of the ports of Finland and the Caspian sea. In 1859 the commercial fleet consisted of 1,416 vessels of 172,605 tons, with from 10,000 to 11,000 sailors. The inland trade is carried on in a very great measure by means of annual fairs, of which that at Nijni Novgorod is the most remarkable. —The first railway in Russia was completed in 1836, and extends from St. Petersburg to Tzarskoe-Selo and Pavlovsk, two imperial residences, distant from the capital 17 m. A much more important road, from St. Petersburg to Moscow, was opened in 1851, and is 398 m. long. The other railways already constructed are from St. Petersburg to Peterhoff, 18 m. long; from St. Petersburg to Pskov, 170 m.; from Moscow to Vladimir (opened in 1860); and from Warsaw to Czenstochowa on the Prussian frontier, 182 m., thence prolonged to Cracow, 100 m. There are lines in the course of construction from Pskov to Warsaw, 462 m. (the 2 sections from Pskov to Ostrov and from Ostrov to Dünaburg were opened in 1860, and the whole line was to be opened by the end of 1861); from Dünaburg to Riga, 145 m.; from Moscow to Kaffa or Feodosia, 990 m.; from Dünaburg to Libau, 198 m. The line from St. Petersburg to Königsberg and direct to Berlin is to be completed in the course of 1861. The following are the most important telegraphic lines already completed: St. Petersburg, *via* Koorsk and Kiev, to the Austrian frontier, 928 m.; St. Petersburg to Polangen, *via* Narva, Revel, Pernau, Riga, and Libau, 663 m.; St. Petersburg, *via* Kovno, to the Prussian frontier, 594 m.; Koorsk to Simferopol, 530 m.; St. Petersburg to Abo, 396 m. There are also a few smaller lines completed, making a total of 3,395 m., and many more lines are projected. The government telegraph, across the continent of Asia, to Nikolaiev on the Pacific, was to be commenced in 1861, and to be pushed forward to completion as early as possible.—Except England and France, no government of Europe has done so much as the Russian for establishing a continuous water communication by means of canals. The Baltic is connected with the Black sea by the Beresina, the Oginski canal, and the Dnieper and Bug systems, and with the Caspian sea by the Vishni-Volotchok, the Teekhin, and the Maria systems. The canal of the duke Alexander of Württemberg forms a connection between the White sea and the Baltic. Many other canals connect two rivers, as for instance the Don and the Volga. The communication with Siberia is greatly facilitated by natural water ways. The Kama and its affluents, as the Ufa, lead close to the mines of the Ural, and thus expedite the transport of the minerals.—The silver ruble is established by an imperial manifesto of 1839 as the legal and unalterable metallic unit of the money current in the empire. Its value varies somewhat according to the distance from the capital, but is, on an average, equal to 37½d. in English, or 75.4 cts in American money. A ruble is divided into 100 copecks. Platinum pieces of 3 and 6 rubles were coined in 1827. The English inch and foot are generally used throughout the Russian empire, except in measuring timber for the export duties. The sarshin = 7 English feet; 1 verst = 500 sarshins, or 1,166 yards English. The smallest weight is the zolotnik = 6 grains; 3 zolotniks = 1 loth; 32 loths = 1 pound (the Russian pound is the same for gold, silver, and merchandise); 40 pounds = 1 pood; 1 pood = 36 lbs. 1 oz. 10 drs. airoirdupois. Time continues to be reckoned in Russia by the Julian calendar; yet in business with foreign countries the Russians use both the Julian and Gregorian dates.—No empire of the world contains within its borders so great a variety of nations and tribes as Russia; their number exceeds 100, and they speak more than 40 different languages. The smaller and the uncivilized tribes are rapidly being amalgamated with the ruling race, the Russians; but the Poles, the Lithuanians, the German element in the Baltic provinces, the Finns, and perhaps some other nationalities, do not yet give any indications of losing their distinct national character. The immense majority of the population are Slavi, in two principal divisions, Russians and Poles, to which, as a third, though much smaller di-

vision, the Servians and Slavic Bulgarians must be added, counting together about 100,000 souls, and mostly living in settlements on the Dnieper and the Inguletz. The Russians form almost the sole population of Great and Little Russia, and also preponderate in influence, if not in number, in South and West Russia and in the kingdoms of Kasan and Astrakhan. The Russians are again subdivided into the Great and Little Russians. The latter, also called Red Russians, Ruthenians, or Russins, include a large portion of the Cossacks, and inhabit Little Russia and South Russia, and, mixed with Poles, some governments of West Russia. The Great Russians are the predominant race, and their language is used throughout the empire by the government and the majority of the nation. The Poles form the bulk of the population in the kingdom of Poland; but in Lithuania, Volhynia, Little Russia, and White Russia (Smolensk, Vitebsk, and Mohilev), they are mainly confined to the nobles. Among the non-Slavic nations the following are the most important: 1. The Letts have maintained themselves almost pure in the Baltic provinces, especially in Courland; while, as Lithuanians, in the governments of Wilna, Grodno, and Kovno, they have largely amalgamated with Poles. 2. The Germans are, though not a majority, the predominant race in the Baltic provinces. They also have a number of flourishing settlements throughout southern Russia, and large numbers of German scholars, artisans, mechanics, miners, military men, &c., are found in the large cities. They are regarded as the most intelligent portion of the population. 3. The Finns, or Tchuds, have from the oldest times occupied the northern part of European Russia and of Siberia, and along the Volga down to Astrakhan. To them belong the Finns, strictly so called, in Finland, the Tchuds, the Vods, the Esths (in Livonia, Esthonia, Vitebsk, Pskov, and St. Petersburg, altogether 633,496), the Ervemeisets, the Savakots, the Izors, and the Karels (in Archangel, Novgorod, Olonetz, St. Petersburg, Tambov, Tver, and Jaroslav, altogether 171,693). Some ethnographers include among the Finns also a number of other tribes, which Köppen enumerates as unconnected with the Finns, under the two collective names Perm races and Volga races, together about 1,500,000 souls. 4. The Tartar race are represented by the Tartars (in the strict acceptance) in the Crimea, Transcaucasia, Astrakhan, and W. Siberia; the Nogais on the Kooban and Don, and in Taurida; the Metcheviats in Orenburg; the Bashkirs in Orenburg and Perm; the Kirgheez in the kingdom of Astrakhan; and the Yakootians in Yakootsk and Yeniseisk. 5. The Mongols are represented by the Mongols proper and the Buratians in Siberia, and the Kalmucks in Astrakhan, the Don Cossack country, Caucasia, and Siberia. 6. Among the numerous Caucasian tribes, the Georgians or Grusinians, the Imeretians, the Mingrelians, and the Armenians are entirely

subject to the Russian rule, while, among the mountaineers, a number of tribes still keep up the war for their independence. 7. The Persians are represented by the Tadsheeks in Transcaucasia and the Bokharians. The Jews are most numerous in Poland and W. Russia. Greeks are especially found in the cities of Ekaterinoslav, Taurida, and Tchernigov. As to social position, the population is divided into 8 classes with hereditary rights, the nobles, the inhabitants of towns, and the country people. Peter the Great abolished the dignity and official privileges of the boyars (see BOYAR), and since then the *knazias* (princes) have lost their prerogatives as a caste, and the offices of the empire are accessible to all. Peter the Great in 1722 established a regulation (*tchin*), which is still in force, concerning the rank of the officers of state, dividing them into 14 classes, the first 8 of which have hereditary nobility conferred on them, while the members of the 6 latter obtain only a personal nobility. In 1842 there were 551,970 noblemen of hereditary and 257,846 of personal rank. The legal relations of the inhabitants of the towns were established by a fundamental law of the empire, dated April 2, 1801. All the citizens of a town form a civil community, and are divided into 6 classes: 1, the citizens who own houses and lands; 2, the members of the guilds possessed of taxable capital, of which there are 3, requiring severally a capital of at least 8,000, 20,000, and 50,000 rubles; 3, the mechanical trades; 4, the foreign residents who are engaged in trade or business; 5, the officers, artisans, and scholars; and 6, all others. In 1832 a 7th class of honorary citizens, with other personal rights and privileges, was created. The aggregate population of the towns amounts to about 6,000,000. The most numerous class of the population is that of the peasants, numbering about 47,000,000. Before the act of emancipation, they were divided into 8 classes, viz., free peasants, peasants under the special administration of the crown, and serfs. The first class included the *odnodortzi*, or freeholders, who until 1845 formed a subdivision of the country nobility, but were transferred to the class of peasants when by order of the emperor the titles of nobles were examined. The second class comprised the crown peasants, some 16,000,000; the domain peasants; the peasants bestowed on nobles and merchants in some manufacturing governments, on condition that they should return to the crown in case the manufactories were closed; and the exiles in Siberia. The serfs numbered about 22,000,000, and belonged partly to the crown and partly to the nobles. Russian serfdom dates from 1601, when by a ukase they were deprived of the right to move at will from master to master. They were attached to the soil, which they could not leave without the consent of the master; the latter, on the other hand, not having the right to dispose of the serfs without the land. Their lot was greatly ameliorated by ukases in 1845

and 1846, and in 1857 a ukase was promulgated providing that the serfs were to be finally liberated within 12 years after settling the terms to be resolved on between them and the proprietors. On March 17, 1861, an imperial manifesto (dated Feb. 19), providing for the emancipation of the serfs, was read in all the churches of the empire.—The great majority of the inhabitants belong to the Russian church, which in doctrine entirely agrees with the other branches of the Greek church, while in administration it is distinct. Since the times of Peter the Great it has been governed by a "holy synod," which is one of the supreme boards of the empire, but is dependent on the emperor in questions of administration, but not of dogma or of rites. The bishops composing the holy synod reside partly in St. Petersburg, and partly in their dioceses. The church is divided into 52 archiepiscopal dioceses or eparchies. According to the latest accounts the number of secular clergymen was 49,934, of monks 5,211, and of nuns 2,451; of churches 46,022, of monasteries 465, and of nunneries 128; of parishes 30,258, and of chapels 11,956; of ecclesiastical academies 5 (St. Petersburg, Moscow, Kiev, Kasan, and Tomsk, the last established in Oct. 1858), of seminaries 48, and of ecclesiastical schools 201, with 1,849 teachers and 53,042 pupils. The lower clergy are mostly poor, ignorant, and despised, and they are reported to form almost a caste. The government of the present emperor, however, has made better provisions for their theological education, and established a central relief fund for raising their salaries, the minimum of which has been fixed at 200 silver rubles (\$150). The church service is performed in the old Slavic language, which the mass of the people well understand. The liturgy contains, beside the prayers common to all the liturgies of the Greek church, special prayers for every separate member of the imperial family. Sermons until recently were a rare exception at divine service; but about 1840 a movement for preaching sermons every Sunday was successfully commenced. Every Russian is obliged to take the sacrament once a year. The established church has some special privileges, as the ringing of the larger bells, public processions, &c. None of its members are allowed to secede to another denomination, and all children born of mixed marriages are claimed for it. All foreign princesses marrying into the imperial family must likewise embrace the national religion. In other respects Catholics and Protestants enjoy equal civil rights with members of the established church, and are equally admissible to the highest offices of the empire; while unconverted Tartars are admitted to military offices. The political separation of the Russian church from the main body of the Greek church took place after the flight of the Greek patriarch from Constantinople to Moscow in the 16th century. Archbishop Isidore of Kiev and Moscow in 1489 visited the council of Florence to promote a

union of the eastern churches with the Latin, but on his return was arrested and deposed. Fedor I. in 1589 appointed the first Russian patriarch, and even obtained for the new dignity in 1593 the recognition of the 4 oriental patriarchs. The patriarchate was again abolished by Peter I., who transferred the supreme administration to the "holy synod," reserving for himself and his successors the headship of the church. To a still higher degree was the church stripped of her independence under Catharine II., the secular government assuming all the property of the church and the education and appointment of the clergy. In point of zeal and activity the Russian church cannot compare with the Roman Catholic and the Protestant churches. A Bible society was organized under Alexander I.; it was suppressed during the reign of Nicholas, but has resumed its operations under Alexander II., who is a liberal contributor to its funds. Foreign missions on a small scale have been carried on among the non-Christian tribes of the empire; outside of which only one missionary station is to be found, viz., at Peking, China, where the descendants of Russian captives have remained faithful to the Greek church, and, according to a treaty between Russia and China, are supplied by Russia with priests, who are changed every seventh year. Of late a number of members of the highest Russian aristocracy, as Prince Gallitzin, Prince Gagarin, Count Shuvaloff, the princess Bariatski, and others, have joined the Roman Catholic church; and Prince Gagarin (who entered the order of the Jesuits) maintains that there exists in the Russian church a considerable party favorable to a corporate union of the church with Rome. The membership of the established church in 1856 was stated to be 49,159,714 souls, exclusive of the army, which consists of 577,859 men. This number embraces, however, also the numerous Greek sects, whose membership is differently stated at from 5,000,000 to 15,000,000. (See RASKOLNIKS.) The Gregorian Armenian church has 6 eparchies (Nakhitchewan and Bessarabia, Astrakhan, Erivan, Grusino-Imeretia, Kavabagh, and Shirvan), of which 5 are under archbishops and one is ruled by a supreme patriarch. The latter has his seat at Etchmiadzin, and is the head of the entire Armenian church, in the government of which he is assisted by a synod of 4 archbishops or bishops, and 4 archimandrites, all of whom are chosen by the patriarch and confirmed by the emperor. The most celebrated literary institution of this church is the Lazareff institute for oriental languages at Moscow, which provides for the education of 20 youths. The Roman Catholic church had in 1856 (exclusive of Poland) 2,750,000 members of the Latin rite, 380,000 of the Greek, and 14,000 of the Armenian. The Catholics have an archbishop at Mohilev, and 10 bishops, 1,100 parish churches, 340 affiliated churches, 1,464 chapels, a small number of monasteries, and about 2,800 members of the white or secular clergy. The

property of the church was confiscated in 1841, in order to put it on a level with the Greek church, and the clergy are supported by the state. Formerly the United Greeks were very numerous in Volhynia, Lithuania, and White Russia; but in consequence of a resolution passed in 1839 by the synod at Polotzk, a population of about 2,000,000 souls was, not without many protests, separated from the communion of Rome, and united with the established church. The Lutheran church (exclusive of Finland, which is entirely Lutheran, and Poland) is divided into 6 consistorial districts, viz.: St. Petersburg, extending to the south as far as Bessarabia, 227,108 souls; Moscow, embracing the whole eastern portion as far as Siberia, 146,188; Courland, 490,000; Livonia, 635,000; Esthonia, 297,361; and the island of Oesel, 84,406. Southern Russia had 90,739 Lutherans. The general consistory has its seat at St. Petersburg; its vice-president has the honorary title of bishop; the president is a layman. A Lutheran theological faculty is connected with the university of Dorpat. The Reformed denomination have about 30 churches, mostly in Lithuania, where they are organized into a synod. The scattered Reformed congregations in other parts of the empire are under the jurisdiction of the Lutheran consistories. The Mennonites, whose number has of late largely increased by immigration, claim a population of about 28,000. The Moravians have 265 societies and 64,285 members. Of the non-Christian population, the Jews have 345 synagogues, 4,935 rabbis, readers, and teachers, and 1,250,000 souls; the Mohammedans (both Soonnees and Sheeahs) 4,718 mosques, 7,924 muftis, mollahs, and teachers, and 2,750,000 souls; and of pagans there are still (exclusive of the new territory on the Amoor) about 400,000, with 490 places of worship, and 4,718 priests. The most numerous of the pagans are the Buddhists, with 380 places of worship, 4,400 priests, and about 200,000 souls.—The cause of public education was first effectively promoted by Peter the Great, who introduced European civilization among the noble families. Catharine II. founded many towns, schools, and literary institutions. Alexander I. made great efforts in behalf of the people of the country, and tried to establish a complete system of public education. The principal departments of education, with the exception of the military schools, are under the superintendence of the ministry of national enlightenment and public instruction, established in 1802. The empire (excepting Poland and Finland) is divided into 10 circles of instruction, viz.: St. Petersburg, Moscow, Kharkov, Kiev, Kasan, Odessa, Dorpat, Siberia, the Caucasus, and Wilna, each of which is under the superintendence of a curator. In 1859 there were 6 universities, at St. Petersburg, Moscow, Kiev, Kasan, Kharkov, and Dorpat. The last named is the only one which has a theological faculty; the other universities have only 4 faculties, viz.: historico-philological, physico-mathematical, juridical, and medical.

Together they had 594 professors with 5,814 students. The other educational establishments are: 2 lyceums, 84 gymnasia, and 458 district, 1,090 parish, 19 primary, 654 private, 2 veterinary, and 107 Hebrew schools. In the Caucasian and Transcaucasian countries there were among others 11 Mohammedan schools, 7 of Sheeahs and 4 of Soonnees, with 586 pupils. A number of literary establishments belong to other departments of the state ministry; among them are 12 institutions dependent on the minister of the navy, a law school, a polytechnic school, a commercial academy, 3 navigation schools, a school of engineers, a mining school, 10 district and 64 primary mining schools, and an institute for oriental languages. The study of oriental languages has been cultivated of late with special zeal, and no other university of Europe has so many active professors of Asiatic languages as that of Kasan. The aggregate number of all schools in the entire empire (including Poland and Finland) in 1856 was 8,227, with 450,002 scholars, of which almost  $\frac{1}{2}$  belong to Poland. On an average, there is 1 scholar to 143 inhabitants.—Russia possesses 42 public libraries, the largest of which, at St. Petersburg, has 802,717 volumes, 28,536 manuscripts, and 65,503 engravings. The number of learned societies is 13, among which are the imperial academy of sciences, the archæological committee, the Russian geographical society at St. Petersburg, and the historical society at Moscow. The number of books printed in the whole empire amounted in 1849 to 917, and in 1857 to 1,626; the number of journals and periodicals issued in 1859 was 204.—The government of Russia is an absolute monarchy. The emperor has the title *samoderzhets* or autocrat of all the Russias, czar of Poland, grand duke of Finland, &c. According to a law of 1797 the crown was hereditary by the right of primogeniture, and with preference of the male descendants; but Nicholas changed this law and excluded females altogether. The children of a marriage not recognized by the emperor are excluded from the succession. The hereditary grand prince becomes of full age at 16, and the other grand princes at 18. With regard to Finland, the emperor is bound by the act of incorporation of 1809, which secures to that country certain privileges. The highest consultative body of the empire is the imperial council, generally presided over by the emperor himself; it consists of the ministers, and such other functionaries as the emperor may appoint. It is divided into 6 departments, for legislative, military, civil, and ecclesiastical affairs, for political economy, and for the affairs of Poland. Each department has its own president and secretary. Next in importance among the central boards of the empire is the directing senate, created in 1711 by Peter the Great, which is charged with the promulgation and execution of the laws, and forms the supreme court of cassation; the number of members does not



generally exceed 120. The senate is subdivided into 10 sections, 5 of which have their seat at St. Petersburg, 3 at Moscow, and 2 at Warsaw. The third central board is the holy synod, which has jurisdiction over the affairs of the Russian state church; a section of it has its seat at Moscow. The state ministry consists of 10 ministers, some of whom are assisted by an adjunct minister, and of 3 directors-general. The 10 ministers are: for foreign affairs and state archives, war, marine and the colonies, the interior, public instruction and popular enlightenment, finances and trade, the domains of the empire, justice, the imperial household, and the apanages. The following are the 3 general directions: control of the empire, posts, and land and water communications. There are, further, a state minister for Poland, who takes part in the meetings of the ministers, and a secretary of state for Finland.—Russia has various kinds of jurisdiction. It has municipal tribunals for the towns, rural justices for the country, and special tribunals for the nobility and for the Jews. The Baltic provinces have courts of the first instance of their own. The courts of second instance are constituted alike throughout the empire; and the capital of every government has a court of appeal. The directing senate forms the highest judicial court. Since 1833 Russia has had a voluminous code, which, in 42,198 articles, contains an abstract of all the laws or ordinances issued by the different emperors from 1649 downward, and forms 15 volumes. The death penalty is now limited to the crime

of high treason; in all other cases it is replaced by forced labor in Siberia, connected with civil death and separation from the family. The knout is regarded as a penalty of infamy, and is always followed by exile to Siberia; other kinds of corporal punishment are the cat-o'-nine-tails and running the gauntlet, which is practised in the army alone. The criminal statistics of 1856 embraced 283,229 criminal, civil, and police cases; of these 57,130 were convicted, 53,000 pardoned by manifests, 99,656 acquitted, 1,574 sentenced to labor in the mines, 157 sentenced to the settlements in Transcaucasia, and 3,839 to Siberia. Among the above were 1,124 cases of murder, 280 of arson, 73 of highway robbery, 6,049 of theft and robbery, 743 of burglary, 101 of false coining, and 126 offences against religion. The cases of murder average about 1,000 a year, and the same is the average number of suicides.—The Russian army was organized by Peter the Great on a plan similar to that followed in the civilized countries of Europe. It is, however, principally to the emperors Alexander I. and Nicholas that the army is indebted for the efficient organization, discipline, and power for which it is now distinguished. It is divided into the regular and the irregular army, and the army of the Caucasus. The regular army is divided into 9 *corps d'armée*, and each *corps d'armée* into 3 divisions of infantry, 1 or 2 divisions of cavalry, with some brigades of artillery and battalions of chasseurs. The following table gives a complete view of all the divisions and the present strength of the army:

Corps d'armée in time of peace.	Infantry.				Cavalry.			Artillery.						Total force.
	Divisions.	Brigades.	Regiments.	Active battalions.	Divisions.	Brigades.	Regiments.	Divisions.	Brigades.	Battalions mounted.	Battalions on foot.	Parks.	Battalions of sappers.	
One corps of guards.....	3	6	12	24	2	6	12	..	3	6	5	..	1	83,450
Chasseurs of the guards.....	..	..	..	3	..	..	..	..	..	..	..	..	..	3,337
One corps of grenadiers.....	3	6	12	24	1	3	6	1	5	15	3	4	1	27,588
Chasseurs of the grenadiers.....	..	..	..	3	..	..	..	..	..	..	..	..	..	8,249
Six corps of infantry.....	18	36	72	216	6	18	36	6	30	90	18	24	0	273,730
Chasseurs.....	..	..	..	18	..	..	..	..	..	..	..	1 division of pioneers.	..	8,517
Reserved corps of cavalry.....	..	..	..	..	2	4	8	1	..	..	6	..	..	19,494
Army of the Caucasus.														
One division of grenadiers.....	1	2	4	20	..	..	1	1	1	4	..	1	..	27,550
Divisions of infantry.....	3	6	12	60	..	..	3	1	3	12	..	3	2	84,820
Chasseurs (1 battalion of grenadiers).....	..	..	..	4	..	..	..	..	..	..	..	..	..	4,732
Battalions of the line.....	..	4	..	37	..	..	..	..	..	..	..	..	..	40,811
Corps of Orenburg.....	1	2	..	11	..	..	..	..	..	..	..	..	..	12,138
Corps of Siberia.....	1	3	..	16	..	..	..	..	..	..	..	..	..	17,048
Troops in Finland.....	1	2	..	10	..	..	..	..	..	..	..	..	..	11,080
Chasseurs in encampment.....	..	..	..	9	..	..	..	..	..	..	..	..	1	3,000
Chasseurs of Finland.....	..	..	..	1	..	..	..	..	..	..	..	..	..	1,125
Total.....	81	67	119	456	11	31	66	9	42	127	82	82	11	577,859

Beside the above, Russia has a formidable force of irregular troops, consisting of upward of 50,000 men in garrison, above 100,000 veterans, and the Cossacks and the colonized regiments, numbering about 180,000 men. The real force of the Russian army can be raised to about 1,000,000 men. As magistrates, clergymen, merchants, and students are exempt from military service, the army is recruited almost exclusively from the classes of peasants and

artisans. The levies are usually in the proportion of 5 or 6 to every 1,000 souls in time of peace, but of course much larger in time of war; and during the eastern war they amounted to 13 to every 1,000 inhabitants in 18 governments. According to a manifesto of 1834 no levy is to take place simultaneously in all governments of the empire. The nobles have to furnish a number of serfs as their quota of recruits, and to equip them at their own cost.

The prescribed term of service is 20 years, yet it is common to dismiss those who have served 15 years on furlough. The pay of the soldiers is less than in any other state. Good provision has been made for the sick and the invalid. There are 9 large and 23 small military hospitals, 5 houses of invalids, and a military orphan house at St. Petersburg.—The naval force of Russia is considerable. In 1859 the following vessels were afloat: in the Baltic sea, 9 ships of the line, 6 screw frigates, 10 sloops of war, 6 clippers, 1 imperial steam yacht, 2 brigs, 5 schooners, 1 tender, 8 yachts, 6 transports, 4 pilot boats, 19 small steamers, and 75 screw gun boats; in the White sea, 1 brig, 1 schooner, 1 transport, and 3 small steamers; in the Caspian sea, 7 schooners, 1 transport, and 9 small steamers; in the Black sea, 6 screw sloops of war, 1 imperial steam yacht, 16 schooners, 4 transports, 1 pilot boat, and 5 small steamers; in the Pacific ocean, 3 schooners, 2 transports, and 5 small steamers. In general the fleet is divided as follows:

Stations.	Steamers.	Sailing vessels.	Total.
Baltic sea .....	187	24	161
White sea .....	8	3	6
Caspian sea .....	13	4	17
Black sea .....	25	8	33
Pacific ocean .....	8	2	10
Total .....	186	141	227

Of smaller shore boats, such as barks, gun boats, cutters, &c., there were in the Baltic sea 262, in the White sea 7, in the Caspian sea 17, in the Black sea 9, in the Pacific ocean 6; total, 301. The naval staff consists of 16 admirals, 30 vice admirals, 39 rear admirals, 111 first captains, 95 second captains, 257 lieutenant captains, 607 lieutenants, and 396 midshipmen. There are boards of marine artillery (281 officers), fleet pilots (663), fleet engineers (125), mechanical engineers (86), and engineers (123). The total number of seamen may be computed at 38,000. The entire marine department is under the administration of a minister assisted by a colleague and an admiralty council. The great naval stations are Cronstadt in the gulf of Finland, and Sebastopol in the Black sea.—The finances of the empire greatly suffered during the agitated times of Alexander I., but improved again under the able administration of Count Kankrin. Most topics connected with the public revenue and expenditures are involved in deep mystery, as the government publishes only an account of the revenues of the crown domains. In 1852, according to Baron von Reden, the revenues (in rubles) were derived from the following sources:

Domains, forests, royal dues, and monopolies:	
Direct property of the crown.....	87,550,000
Property of the apanages.....	8,645,000
Mines, founderies, &c.....	80,500,000
Contributions paid in natural products.....	20,286,000
Contributions paid in coin.....	11,086,000
Royal dues (spirits 73,000,000)....	102,901,100—205,927,000
Direct taxes:	
Capitation tax.....	19,829,000

Roads.....	2,066,000
Patents, passports, &c.....	7,500,000—29,295,000
Indirect taxes:	
Customs.....	81,000,000
Beet sugar.....	450,000
Patents, diplomas, and stamps.....	2,200,000—88,650,000
Various sources.....	6,500,000
Total.....	275,472,000

The expenditures, according to the same authority, were in 1852 as follows:

Household of the emperor and the imperial family.....	10,750,000
Army { in times of peace .....	70,895,060
Navy { .....	26,500,000
Debt.....	83,500,000
Other expenditures.....	184,190,000
Total.....	275,835,000

In 1856 the revenue from the crown domains amounted to 45,412,886 rubles. The public debt, Jan. 1, 1858 and 1859, stood as follows:

1. Temporary debt:	1858.	1859.
Old Dutch loan { .....	80,600,000	80,000,000
2d " " { Dutch florins } .....	16,769,000	15,057,000
Interior debt.....rubles	151,580,118	154,116,76
2. Perpetual debt:		
External and interior.....rubles	809,222,582	806,147,063
Railroad loan.....£ sterling	4,730,000	4,620,000
Total of consolidated debt, ru.	518,384,007	515,988,012
Treasury notes bearing interest .....	90,000,000	93,000,000
Notes of credit without interest.....	755,297,006	644,445,790
Pawnbrokers' loan.....	820,000,000	820,000,000
Total.....	1,663,681,013	1,573,436,502
From this are to be deducted the bills of exchange and the capital of the commission for the liquidation of the public debt, about.....	146,000,000	115,000,000
Balance.....	1,517,681,013	1,458,436,502
For interest and redemption....	87,495,936	83,770,663

—The ancient history of Russia is involved in great obscurity. The Greek and Roman writers mention the Scythians and the Sarmatians as the inhabitants of the vast and unknown regions of the north, especially of the country between the Don and the Dnieper, a description of which is given by Herodotus. Strabo and Tacitus state that the Roxolani, a Scythian tribe, which according to the testimony of Spartianus was ruled by kings, inhabited on the Don, to the west of the Alani, the southern districts of modern Russia. The Greeks entered into commercial relations with them, and established some colonies in their territory. During the migration of nations, Russia witnessed the movements of hordes of Alani, Huns, Avari, and Bulgarians. Soon after the name of the Slavi appears for the first time, a race, according to the general opinion of historians, identical with the Sarmatians, and believed to have extended northward as far as the upper Volga. They founded the towns of Novgorod and Kiev, both of which became the capitals of independent Slavic empires. After a history of about 100 years, of which nothing is known, the empire of Novgorod, of unknown extent, and surrounded by a number of tribes of Finns or Tchuds, appears struggling against the invasion of the Varangians, a tribe of northmen, who succeeded in making both the Slavi and the Finns tributary. For a time the Slavi threw

off the yoke of the Varangians; but sinking into anarchy and feeling themselves unable to cope with internal and external foes, they, together with some of the neighboring Finnish tribes, invited Rurik, the prince of the Russians, a tribe of (or kindred to) the Varangians, to Novgorod, where he arrived in 861, with his brothers Sinf and Truvor, and laid the foundation of the great Russian empire. In a short time all the three races, Slavi, Finns, and Russians, thoroughly amalgamated into one people, which retained the name of Russians, but the language and customs of the Slavi. Rurik introduced a kind of patriarchal constitution, which authorized the prince to bestow on younger members of the family separate principalities, the grand duke of Kiev being their lord paramount. Thus, the two brothers of Rurik were princes of two of the tribes of the new empire; but dying childless, their territories were reunited with the dominions of Rurik. The empire during his reign extended southward as far as the Dña, including the modern governments of Riga, Revel, Polotzk, Pskov, St. Petersburg, Novgorod, Kostroma, Olonez, Archangel, Vladimir, and Vologda. Two other chieftains of the Varangians, Oskold and Dir, went in 865 to the aid of another Slavic tribe on the Dnieper, who were oppressed by the Khazars, conquered the latter, and made their capital, Kiev, the seat of a second Slavo-Russian empire, dependent on the empire of Novgorod. Rurik died in 879, having left the empire, not to his minor son Igor, who was only 4 years old, but to his cousin Oleg, a brave soldier, great conqueror, and wise ruler. Oleg (879-912) conquered the empire of Kiev and united it with his own, vanquished the Khazars, drove the Magyars out of the borders of Russia into the country now occupied by them, and made an expedition by sea (with 2,000 vessels) and land against the emperor of Constantinople, whom in 911 he forced into an advantageous peace. Igor, the son of Rurik (912-'45), put down an insurrection of the Dervians, conquered the Petchenegs who lived on the coasts of the Black sea from the Danube to the mouths of the Dnieper, made an unsuccessful war against the emperor of Constantinople in 941, and was slain in a second war against the Dervians. During the minority of his son Svatoslav (945-'72), his widow, the celebrated Olga, held the reins of government with wisdom and energy. During her reign Christianity began to spread in Kiev, and Olga herself was baptized in 955 at Constantinople, adopting on that occasion the name of Helen. Her son Svatoslav, who remained a pagan, won new victories over the Khazars, subdued the Bulgarians and Petchenegs, and was slain in 972 by the latter, while returning through their territory from a war against Constantinople. He had extended the borders of the empire to the sea of Azof, and in 970 divided it among his 8 sons, giving Kiev to Yaropolk I. (972-'80), the country of the Dervians to Oleg, and Novgorod to Vladimir.

In a war which arose between the 3 brothers, Oleg was slain and Vladimir fled, and the whole empire was reunited under Yaropolk; but in 980 Vladimir returned with the Varangians, conquered Novgorod and Kiev, and, having put his brother to death, became the ruler of all Russia. Vladimir (died 1015), surnamed the Great, on account of the great benefits he conferred on the empire, expelled the Varangians, conquered Galicia and Lithuania, and made Livonia tributary. He at first persecuted Christianity; but having examined the doctrines of Judaism, Mohammedanism, and the Catholic and Greek churches, he declared himself ready to embrace the doctrines of the Greek church, married the sister of the emperor of Constantinople, and was baptized in 988 on the day of his wedding. In 989 he ordered the introduction of Christianity into the entire empire, established churches and schools, and founded a number of new towns. He divided the empire among his 12 sons, who even before the death of the father engaged in a fratricidal war, in which at length Svatopolk I., a son of Vladimir's brother Yaropolk I., but adopted by Vladimir, possessed himself of the throne, after having murdered 8 of his brothers. Another brother, Yaroslav, allied himself with the emperor Henry II. of Germany against Svatopolk, and the father-in-law of the latter, King Boleslas of Poland. The war lasted until 1019, when the 3 days' battle on the Alma decided in favor of Yaroslav, and Svatopolk died on his flight in Poland. Yaroslav (1019-'54) for some time was sole ruler; but in a war against his brother Mstislav, prince of Tmutarakan (who in 1016 had destroyed the empire of the Khazars in Taurida, and in 1022 subdued the Circassians), he was routed in 1024 in the battle at Listven, and had to purchase peace by ceding to his brother one half of the empire. After the death of Mstislav, however, in 1036, the entire empire became once more united under Yaroslav. By a number of successful wars he considerably enlarged the territory of the empire, and like his father introduced many useful reforms. He encouraged literature by causing the translation of many Greek works into Slavic, built churches and schools, increased the number of towns, peopled many waste tracts of land, and ordered the compilation of the first Russian code. Three of his daughters were married to the kings of Norway, France, and Hungary. A few days before his death he divided the empire among his 4 sons, with the provision, however, that the 3 younger ones should obey the eldest brother Izaslav, to whom he gave Kiev and Novgorod. But this provision proved of little avail; the 4 divisions of the empire were again subdivided, and the Russian monarchy was changed into a confederacy. The power of the nation was broken by a never ceasing internal war, and large territories in western Russia were taken possession of by the Poles, Lithuanians, Danes, the Teutonic knights,

and others. At home poverty and barbarity took the place of the civilization which had so hopefully dawned during the reigns of Vladimir and Yaroslav. Yet many important cities were founded during this period, as Moscow in 1147; and Kiev and Novgorod took their place among the wealthiest and most prosperous cities of Europe. The calamity of civil war was soon followed by one still greater. From eastern Asia innumerable hordes of Mongols under Genghis Khan and his sons advanced toward Russia. The princes of Kiev, Volhynia, and several others made a fruitless attempt to arrest their course, being totally routed in a battle on the Kalka, in the government of Ekaterinoslav. The victors did not follow up their advantage, but returned eastward to wage war against the nations of southern Asia, and the Russians believed them to be a special scourge sent to the country by the wrath of God. The danger from abroad did not however cure the internal dissensions. Internecine war recommenced, and famine, pestilence, earthquake, and other horrors completed the dismay of the inhabitants. In 1230 30,000 men died of the plague in Smolensk, and 42,000 in Novgorod. In 1231 the Mongols returned under Batu, and in 1238 the grand prince Yurge (George) II. was routed by them on the Sita and slain. Many towns and villages were then sacked, and far and wide the soil reeked with the blood of the murdered inhabitants. Only the priests and their families were spared. Russia remained for upward of 200 years (until 1462) under the power or at least the influence of the Mongols. The grand princes had to pay tribute to the Mongols; and though many of them gained some victories over the Asiatic barbarians, they did not succeed in restoring the independence and greatness of Russia. Under Yaroslav II. (1238-'47) Kiev was wholly destroyed, and its former glory and greatness departed for ever. Alexander Nevskoi (died 1263), at first prince of Novgorod, which state had remained almost independent of the Mongols, and afterward grand prince of Kiev, in 1241 won signal victories over the Swedes, Livonians, and Lithuanians on the Neva (hence his surname). Under Yaroslav III. (1263-'72) the Genoese founded Kaffa and the powerful city of Crimea (now a decayed hamlet) on the peninsula which afterward received the same name. Alexander II. (1326-'8) lost White Russia in a war against the Lithuanians. A better era commenced with Ivan (John) I. Kalita (*i. e.*, the Purse, on account of his benevolence), prince of Moscow (1328-'40). The khan of the Mongols appointed him grand prince, and this dignity henceforth remained with Moscow. He united Tver with Moscow, embellished the city with many new churches, and commenced in 1339 the reconstruction of the Kremlin. Some time before his death he retired into a convent and died as a monk. His son Simeon I. the Proud (1340-'53) was the first who called himself the grand prince of all Russia, and under his vigorous

rule the prosperity of Russia would have returned but for the sudden appearance of the "black death," which ravaged the entire empire, and to which the prince himself succumbed. Demetrius (Russian, Dmitri) III. (1359-'62), before prince of Susdal, and Demetrius IV. (1363-'89), a grandson of Ivan II., were both appointed grand princes by the Mongols. The latter conceived the plan of shaking off the yoke of the Mongols, and carefully trained a grand army for this purpose. He routed them in 1378, and again in 1380 on the Don (hence his surname Donskoi), where 100,000 Mongols are reported to have been slain. But in 1381 they again returned, burned Vladimir and Moscow, and slew in the latter city alone 24,000 inhabitants. Demetrius was obliged to purchase peace by heavy sacrifices, after which he took revenge of the Russian princes, to whose defection he owed his last defeat, and all of them save the prince of Tver were subjected to his rule. Under his reign silver coins and firearms were for the first time introduced into Russia, and the Permians, with their prince Stephen, were converted to Christianity. The power of the grand principality of Moscow was greatly increased during the reign of Basil II. (1389-1425) by the incorporation of Nijni Novgorod and Susdal, and under Basil III. (1425-'62) by the incorporation of Halicz, Mozhaik, and Borovsk. During the reign of the latter the metropolitan Isidore of Kiev took part in the general council of Florence (1438), and subscribed to the act of union of the Greek and Latin churches; but Basil disapproved this step, and ordered Isidore to be thrown into prison, whence after some years he escaped into Italy. A new period in the history of Russia begins with its entire deliverance from the rule and influence of the Mongols through Ivan III., surnamed the Great (1462-1505). Having strengthened his power by a victory over the khan of Kasan, whom he made tributary in 1469, and by the conquest and annexation of Novgorod, Perm, and Pskov, he declared to the ambassadors of the Mongols that Russia would henceforth cease to pay them tribute, and successfully resisted their renewed invasion. He then conquered and annexed several more Russian principalities, as Tver in 1485, Kasan in 1486, the territory of the Vodyakians in 1487, and a part of Siberia in 1499. But in a war against the Lithuanians, who were aided by the Teutonic knights, he was in 1501 totally routed on the Siritza, and was compelled to conclude a truce for 6 years, and a little later a peace for 50 years. He was married to Sophia, a princess of the late imperial house of Constantinople, and, to express his rights as a blood relation of the imperial family, adopted a double-headed eagle for his escutcheon. He improved the laws, regulated the public taxes, and was the first who assumed the title of autocrat of all the Russias. His gifted son Ivan, married to Helen, a daughter of the prince of Moldavia, died long before

the father (1490), leaving a son Demetrius, to whom the intriguing mother endeavored to secure the succession. She persuaded the aged grand prince that his (second) wife Sophia and her son Basil were plotting against his life. The scheme for a while was successful; all the supposed participants in the conspiracy were cruelly punished, and Demetrius was crowned as heir apparent in 1498. But soon afterward the intrigue was discovered, Helen and her son were imprisoned, and Basil crowned in 1499 as grand prince of Novgorod and Pskov. Under the reign of Basil IV. (1505-'33), the last semi-independent principality ceased by the final incorporation of Pskov in 1510 and Kasan in 1517. The hereditary war of the Russians against Lithuania was carried on by him with varying success; but the Tartars of Kasan were completely routed in 1524 and 1530 and made tributary. At his death his son Ivan IV. (1533-'84) was only 3 years old, and during his minority the empire was a prey to court cabals and internal war, which did not end until 1545, when Ivan, being 14 years old, seized himself the reins of government. He soon restored order by cruel energy, and such was the terror which during his long rule he struck into his subjects that history has given to him the surname of the Terrible. Yet he contributed more to the greatness of Russia than any of his predecessors. In 1552 he reconquered Kasan, whose ruler during his minority had made himself independent, in 1553 opened a commercial road to Archangel, in 1554 subdued Astrakhan and the Crimea, in 1558 established himself after 3 successful campaigns in Livonia and Esthonia, and in 1570 united the country of the Don with his empire. In 1581 a Cossack freebooter, Yermak Timofeyeff, conquered for him Siberia. An attempt to drive the Teutonic knights out of Livonia failed, because the Germans, Poles (under Stephen Bathori), Danes, and Swedes united against him; and at the peace, concluded in 1582, he had to cede Livonia to Sweden. He greatly encouraged commerce, concluded commercial treaties with England in 1566, called many foreigners, especially Germans and Englishmen, into his empire, established in 1569 a printing office in Moscow, and in 1545 created a standing army, called the *striel'tzi*. In 1563 he feigned for a while to withdraw from the government and to leave it to the vanquished khan of Kasan; at the same time he surrounded himself with a body guard of young noblemen, called Oppitchinkia, to whom he assigned the property of 12,000 wealthy citizens. But soon, escorted by them, he returned to the helm of government, more ferocious than ever. In Novgorod, which he hated on account of the liberal views entertained by the citizens, he put more than 60,000 men to death in 1570 by the most exquisite tortures. Similar scenes occurred in Tver and Moscow. In 1582 he murdered with his own hand his son Ivan, the associate of his orgies

and his cruelties. Full of repentance and despair, he soon after intended to abdicate and retire into a convent, but died before this design could be executed (1584). His son Fedor I. (1584-'98) was weak in mind and body, and, according to an order of his father, was assisted in the government by 4 boyars and a state council of 31 members. In 1588 the brother-in-law of Fedor, Boris Fedorovitch Godunoff, a man of great talents but immoderate ambition, obtained the sole control of state affairs. He secured Siberia to Russia by the establishment of new colonies, as Turinsk (1586), Tobolsk (1588), and others. Aspiring himself to the throne, many of his rivals and several members of the imperial family were put out of the way by means of exile or poison. Fedor himself is believed to have died of poison, and with him the house of Rurik became extinct. Boris Godunoff attained his ambitious end, and was called by the boyars to the throne. He established serfdom, but his reign was in many respects beneficent; law was impartially administered, arts and trades encouraged, many intelligent foreigners called into the empire, and the enlightenment of the people promoted. Yet civil war, cruelty against the boyars, and a terrible famine in 1601, by which in Moscow alone 127,000 persons perished, created great dissatisfaction. An impostor, claiming to be Demetrius the son of Ivan, the late czar Fedor's oldest brother, stirred up a rebellion (see DEMETRIUS), and, after the sudden death of Boris Godunoff in 1605, dethroned Fedor, the son of the latter, and was himself crowned as czar. But in the next year he lost crown and life in a conspiracy, and the Russian grandees made the boyar Shuiski czar, who was crowned on June 1, 1606, as Basil Ivanovitch. Another pseudo-Demetrius rose against him, and, with the support of several Polish magnates who aspired to Russian principalities, advanced victoriously toward Moscow. Basil sought and obtained an alliance with the Swedes, which however induced the king of Poland to espouse openly the cause of the pseudo-Demetrius. The Swedish troops soon went over to the Poles, Moscow was forced to surrender (1610), and the czar was taken prisoner and died the next year in a Polish prison. The boyars were compelled to elect a Polish prince, Ladislas, the son of Sigismund III., as czar; but as the Poles treated Russia as a conquered province, a general insurrection broke out. Moscow was burned in 1611 by the Poles, and about 100,000 persons lost their lives on this occasion; but in 1612 the Poles were forced to evacuate Russia. In the next year the Russians elevated to the throne Michael Fedorovitch Romanoff, the first czar of the present imperial family. He was a son of the metropolitan Fedor of Rostov, whose grandfather was the brother of the wife of Ivan the Terrible, and was therefore in the female line a descendant of Rurik. Michael (1613-'45) concluded in 1617 a peace with Gustavus Adolphus of Swe-

den, and for Novgorod, which was returned to him, he ceded Kexholm, Ingria, and Karelia to Sweden. With the Poles, who in alliance with the Cossacks conquered several Russian provinces and advanced as far as Moscow, he concluded a peace at Devilina in 1618, and, after another war, a second peace at Viasma in 1634, in which he ceded to the Poles Smolensk and Tchernigov, while Ladislas, now king of Poland, abandoned all his claims to the Russian throne. Having thus restored peace, he devoted his whole energy to promoting the internal prosperity of his empire. Commerce, which had been entirely prostrate, was revived by treaties with England, France, Persia, and China; and the borders of his Asiatic possessions were extended in 1639 to the Pacific. Under his son Alexei (1645-'76) the Cossacks in 1654 acknowledged the sovereignty of the czar. A war with Poland was terminated by the truce at Niemetz in 1656, which restored to Russia Smolensk and Tchernigov; and after a second war, concluded by the peace at Andruszow (1667), Kiev and the Ukraine were also ceded to Russia. Under the reign of Alexei the last pseudo-Demetrius was beheaded. The reign of his son Fedor (1676-'82) was signalized by many important reforms, though not by any stirring events. According to his last will, not his imbecile brother Ivan, the heir apparent, but his half brother Peter, whose eminent talents he seems to have anticipated, was to succeed him. But the sister of Ivan, Sophia, plotted a conspiracy, in consequence of which both Ivan and Peter were proclaimed czars, and she herself obtained the regency of the empire. Her further designs against Peter were however frustrated, and she was herself arrested and shut up for the remainder of her life in a convent. Ivan gladly abandoned his claim to the throne, which was now mounted by Peter, the creator of the present greatness of Russia, and to whom history has given the appellation of the Great. In a brief time he transformed the entire nation. Russia became the most powerful empire of northern Europe, and henceforth regarded herself and was generally regarded as a leading member in the family of European states. In 1703 he founded a new capital, St. Petersburg, which soon became one of the largest cities of Europe. The battle at Pultowa (1709) destroyed the superiority of Sweden, and in the peace of Nystadt (1721) he united Ingria, Karelia, Esthonia, and Livonia with Russia. He was equally successful against Persia, which in 1723 ceded the provinces of Daghestan, Shirvan, and Ghilan, with the towns of Bakoo and Derbent. His wife and successor, Catharine I. (1725-'7), guided and supported by two favorites of Peter, Mentchikoff and Buturlin, made likewise many important improvements. She increased the army and navy, diminished the taxes, and recalled the exiles from Siberia. She concluded an offensive and defensive alliance with Austria, and sent an ambassador to China to propose a com-

mercial treaty. According to her will, she was succeeded by Peter II. (1727-'30), a grandson of Peter I. and only 11 years old. Although a council of tutors had been appointed, Prince Mentchikoff seized the sole control of public affairs, but was himself within 6 months displaced by Prince Dolgoruki, exiled to Siberia, and his property confiscated. After the sudden death of Peter the crown devolved on Anna, the daughter of Ivan Alexeievitch (half brother of Peter the Great), and widow of the duke of Courland. An attempt was made to force on her a "capitulation," restricting the rights of the crown in favor of the boyars; but Anna soon discarded the compact, exiled the princes Dolgoruki and Gallitzin, abolished the privy council, and reorganized the senate on an entirely new basis. The Kirgheez tribes in 1731 submitted to the protectorate of Russia, but the Persian provinces were lost by the treaty of Reshd (1732), and by the conquests of Nadir (1736). Under her reign the N. E. coast of Siberia, the Aleutian and Behring's islands, were discovered, and the whole of Siberia incorporated with the empire. In the civil war of Poland Anna took sides with Augustus III., who promised to her favorite, Duke Biron, the duchy of Courland, then a Polish fief. The success of Augustus secured the Russian influence in Polish affairs. In the war against Turkey, Field Marshal Count Münnich conquered Moldavia; but when Austria concluded the unfavorable peace of Belgrade (1739), Russia also laid down its arms and gave up Moldavia. After her death, her grand nephew Ivan VII. (1740-'41), a child only a few months old, was proclaimed czar under the regency of Duke Biron of Courland; but soon he was dethroned by Elizabeth Petrovna (1741-'62), the daughter of Peter the Great and Catharine I. In the first years of her reign Sweden was instigated by France to a war against Russia, which was terminated in 1763 by the peace of Abo, and secured to Russia the possession of some districts of Finland. In the 7 years' war Elizabeth supported Austria, and the victories of Jägerndorf and Kunersdorf, and even the defeat at Zorndorf, apprised Europe of the great improvements introduced into the Russian army. Under her reign the death penalty and the rack were abolished, but sentences of exile were numerous. She greatly advanced the interests of science and literature by establishing the academy of science at St. Petersburg, the first Russian university at Moscow (1755), two colleges, an academy of the plastic arts, and several other important literary institutions. She was succeeded by Peter III., the son of her sister, and formerly duke of Holstein, who immediately on his accession gave up the alliance with Austria, and concluded, first a peace, and soon after an offensive alliance with Frederick the Great of Prussia. After a reign of only a few months, Peter lost the crown and his life by a court revolution, at the head of which was his own wife, a daughter of the

duke of Anhalt-Zerbst, who in his place ascended the throne as Catharine II. (1762-'96). During her reign Russia gained a leading and decisive influence in the system of European policy, and was without further dissent recognized as one of the great powers of Europe. Catharine fully comprehended the necessity of external peace for the development of the internal resources of the empire, and soon after her accession recalled the Russian troops from the 7 years' war. She surrounded her throne with a host of illustrious statesmen and warriors, such as Gallitzin, Rumiantzoff, Panin, Orloff, Todtleben, Soltikoff, Suwaroff, Tchernitchew, Repnin, Potemkin, and many others. She took a prominent part in the nefarious dismemberments of the Polish empire in 1772, 1793, and 1795-'6, and received herself the lion's share, consisting of nearly two thirds of the Polish kingdom; and in a number of successful wars she wrested from the Turks the Crimea, Azof, and several other territories. Grusia in 1783 submitted to her protectorate; Jever in Oldenburg fell to her crown in 1793 by inheritance; and in 1795 Courland paid homage to the Russian sceptre. Altogether the territory of Russia was enlarged during her reign by nearly 225,000 square miles, and the population increased by several millions. The internal progress was no less signal. More than 50,000 industrious foreigners settled in the fine agricultural districts of southern Russia as colonists, and a large number of new educational and charitable institutions were established. Commerce, navigation, and industry all prospered and greatly improved under the fostering care of Catharine; the administration of the empire was thoroughly reorganized, and in 1766 the liberal empress even convoked a general assembly of delegates from the provinces to consult respecting the compilation of a new code of laws. Her son, Paul I. (1796-1801), took an active part in the European war kindled by the French revolution. He formed a defensive and offensive alliance against France, with England, Austria, Naples, and the Porte. Three Russian armies were sent in 1799 against the French republic to Italy, Switzerland, and Holland, and their chief commander, Suwaroff, established for himself the reputation of being one of the best generals of the age, and at the same time greatly strengthened the Russian influence on European policy. Dissatisfied with his allies, Paul soon recalled the army, concluded with Denmark and Sweden, in Dec. 1800, a convention of armed neutrality, and even made friendly advances toward France, when a conspiracy of Russian nobles, who had suffered much from his despotic caprices, and were urged on to revenge by British and Austrian intrigues, led to his assassination. His son, Alexander I. (1801-'25), was strongly inclined in favor of a peaceful policy, though he found it impossible to keep out of the general war. He mediated in 1801, in concert with France, the peace of

Lüneburg, which involved the dissolution of the German empire. In 1802 and 1804 he incorporated with Russia all the provinces of Georgia. The faithlessness of France toward Naples and Hanover, and the execution of the duke d'Enghien, induced Alexander to enter again into an anti-French alliance with Austria, England, Sweden, and Naples. A grand army under Kutusoff marched into Moravia, united with the Austrians, and was with them routed at Austerlitz, Dec. 2, 1805. Not more fortunate was the alliance of Alexander with Prussia. After the drawn battle near Eylau, Feb. 8, 1807, the Russians were totally defeated in the bloody battle near Friedland (June 14), and Alexander was forced to conclude the peace of Tilsit (July 7), in which he ceded the Ionian isles to France and Jever to Holland, while he received from Prussia the government of Bialystok, with 184,000 inhabitants. Moreover Russia had to give its adhesion to the continental system, and to close its ports to British vessels. A war with the Turks, which had been instigated by Napoleon, terminated in favor of the Russians, who occupied Moldavia and Wallachia. The peace of Tilsit raised two new enemies against Russia: England, which desired to take revenge for the adhesion of Russia to the continental system, and inflicted great damage on Russian commerce; and Gustavus IV. of Sweden, who in a brief and unfortunate war lost the crown for himself and for his race, while Sweden, in the treaty at Friedrichshamn, Nov. 17, 1809, ceded Finland, the Aland islands, and western Bothnia, a territory with 900,000 inhabitants. For five years Alexander remained on good terms with Napoleon, and in the treaty between France and Austria at Schönbrunn (Oct. 14, 1809) Russia received from Austria the district of Tarnopol in Galicia, with 400,000 inhabitants. Turkey, in the peace at Bucharest in 1812, was obliged to cede Bessarabia and a part of Moldavia; and Persia, in the peace at Gulistan in 1813, the former conquests of Peter the Great, Daghestan and Shirvan. Another great war with France became inevitable when Alexander found it necessary, by a ukase of Dec. 18, 1810, to set aside one of the provisions of the peace of Tilsit. In 1812 Napoleon marched an army of 500,000 men, for which the kings of Prussia, Saxony, Italy, and other vassals had been compelled to furnish large contingents, into Russia. The Russians lost the bloody battle on the Moskva, Sept. 7, and even Moscow fell into the hands of the French; but the burning of the city by the Russians was the beginning of a frightful retreat of the French, during which nearly their whole grand army was destroyed. On Feb. 28, 1813, Russia was joined in her war against France by Prussia, and on Aug. 19 by Austria; and two months later the battle of Leipsic decided the issue of the great Russian-French war, which at length in 1815 terminated with the exile of Napoleon to the island of St. Helena.



In the congresses of Vienna in 1815 and Aix la Chapelle in 1818, which reorganized the political relations of the European states, the influence of Russia was paramount; and in the contest which soon sprung up throughout Europe between the liberal and democratic tendencies of the age and the hereditary rights of the princes, Russia was regarded as the chief support of the latter. At the same time Alexander was eagerly intent on promoting the civilization of his empire and developing its immense resources. Thousands of German colonists, after 1817, peopled the wastes of Bessarabia and the Caucasian countries, the system of public instruction was greatly improved, religious reforms were encouraged, and serfdom had been abolished in Courland and Livonia in 1809. The death of Alexander, Dec. 1, 1825, accelerated the outbreak of a conspiracy which had wide ramifications throughout Russia, and especially in the army. But the brother and successor of Alexander, Nicholas I. (1825-'55), put it down with great energy, and the leaders of the conspiracy were either put to death or exiled to Siberia. A war, commenced by Persia immediately on receiving the intelligence of the death of Alexander, was victoriously terminated by Paskevitch; and by the peace of Turkmanchai, Feb. 22, 1828, Russia gained the provinces of Erivan and Nakhitchevan, 80,000,000 rubles as indemnification, and the exclusive control of the Caspian sea. A war against Turkey commenced in 1828 was equally successful, the Turks being obliged to cede in the peace of Adrianople (Sept. 14, 1829) several fortresses on the frontier and the mouths of the Danube, and to pay a considerable sum as indemnity. The heroic efforts of the Polish nation in 1830-'31 to recover its independence at length succumbed to the overwhelming power of the czar, who by a ukase of 1832 declared the kingdom of Poland a Russian province without diet and without its own army, and openly announced his intention gradually to transform the Poles into Russians. The same plan was pursued with regard to the numerous other tribes and nationalities of the empire, and no means was therefore left untried to extend the dominion of the Russian language and of the Russian church. In 1839 a synod of United Greek bishops was prevailed upon to decree the separation of their dioceses from Rome, and their reunion with the church of Russia; and, notwithstanding numerous protests of priests and congregations, the decree was executed by the government with iron rigor. A war against the independent tribes of the Caucasus, who after 1839 were led by Shamyl, was carried on, with but little interruption and with varying success, through the entire reign of Nicholas, who found it impossible to complete their subjugation. In 1849 a Russian army was sent to the aid of Austria against the Hungarians, and assisted in the suppression of the revolution. In 1853 Russia demanded from the Turkish government certain

guaranties of the rights of the Greek Christians of Turkey, which the Porte believed to involve an actual abdication of its sovereign rights, and which it therefore refused to concede. This led in the same year to the beginning of the "eastern war," in which France, England, and Sardinia took sides (1854) with Turkey, on the ground that the existence of the latter empire, and the equilibrium of political power in Europe, were endangered by Russia. Nicholas did not live to see the end of this war. It was terminated under his son and successor Alexander II., who mounted the throne in March, 1856; and Russia lost by it a small strip of land in Bessarabia, and her naval preponderance on the Black sea. The war in the Caucasus seemed to terminate with the capture of Shamyl, Sept. 6, 1859, and an imperial ukase declared this day a public festival, commemorative of the submission of the eastern Caucasus and of the end of a 50 years' war; but it has since broken out anew, and in July and August, 1861, the Russians suffered several defeats. Favorable commercial treaties were concluded in 1858 and 1860 with Japan and with China, and from the latter power a valuable and extensive tract of land was acquired on the river Amoor. In 1860 the Kirgheez of the valley of the river Tchui, who had invaded the Russian frontier under the command of the chiefs of Khokan, were vanquished, two important fortresses on the upper Tchui taken possession of, and a preponderating influence established over the neighboring khanats. One of the greatest events in the modern history of Russia is the emancipation of the serfs, of which an account has already been given.—Among the numerous works on Russia, the following are most prominent: Reden, *Das Kaiserthum Russland* (Berlin, 1843); Haxthausen, *Studien über die innern Zustände, das Volksleben und insbesondere die ländlichen Einrichtungen Russlands* (3 vols., Hanover, 1847-'52); and Tegoborski, *Études sur les forces productives de la Russie* (3 vols., Paris, 1852-'4). A comprehensive view of the Russian empire by Count A. de Gurowski, entitled "Russia As It Is," has been published (8d ed., New York, 1854). A periodical exclusively devoted to the geography and history of Russia (*Archiv für wissenschaftliche Kunde von Russland*, Berlin, 1841 *et seq.*) was established by Erman, and is still continued. The most valued histories of the Russian empire are by Karamsin, continued by Bludow (11 vols., St. Petersburg, 1816 *et seq.*); by Hermann, *Geschichte von Russland* (5 vols., Hamburg, 1832-'53); and by W. K. Kelly, "History of Russia" (2 vols., London, 1854).

RUSSIA, LANGUAGE AND LITERATURE OF. The Russian language is one of the most widely spread and important idioms of the great Slavic family of languages, of which it forms the easternmost branch. It is distinguished by regularity, flexibility, a fitting mixture of softness and force, and especially by copiousness, it having assimilated and worked up an im-

mense number of Scandinavian, Tartar, Finnish, and other non-Slavic roots. The alphabet consists of 35 letters representing the following sounds or marks: *It. a, b, v* (also *ff*), *g* hard (also *h* and *v*), *d, t, c* (also *ye*, as in *yell*, and *u* as in *but*), *Fr. j, z, It. i*, the same, *k, l, m, n, It. o* (also Eng. *o* as in *hot*), *p, r, s, t, It. u, f, kh* (Ger. *ch*), *tz* (It. and Ger. *z*), *tch* (Pol. *cz*, Hung. *cs*), *sh, shch* (Pol. *szcz*), mark of hardness, Ger. *ü* (nearly, Pol. *y*), mark of softness, *ys* (Ger. *je*), *e, yu* (Ger. *ju*), *ya* (Ger. *ja*), *f, It. i* (also *v*). The accent, unlike the Polish, is varied. The grammatical structure in most points resembles that of the latter language. (See POLAND, LANGUAGE AND LITERATURE OF.) The verb, however, is less richly developed. The following examples will show some of the grammatical features of the language: Masculine noun declined: nom. *tzar*, (a, the) czar or king; gen. *tzarya*; dat. *tzaryu*; acc. *tzarya*; voc. *tzar*; instrumental, *tzarem*; indicative, *tzarye*; pl.: *tzari, tzarey, tzaryam, tzarey, tzari, tzaryami, tzaryakh*. Feminine noun, sing.: *ruka*, hand, *ruki, rukye, ruku, ruks, rukoyu, rukye*; pl.: *ruki, ruk, rukam, ruki, ruki, rukami, rukakh*. Neuter noun, sing.: *zerkalo*, looking glass, *zerkala, zerkalu, zerkalo, zerkalo, zerkalom, zerkalye*; pl.: *zerkala, zerkal, zerkalam, zerkala, zerkala, zerkalami, zerkalakh*. Adjective masc. sing.: *mydriy*, wise, *mudravo, mudromu, mudriy* (*mudravo*), *mudriy, mudrim, mudrom*; pl.: *mudriye, mudrikh, mudrim, mudriye* (*mudrikh*), *mudriye, mudrimi, mudrikh*. The personal pronouns are the following: *ya, I; ti, thou; on, he; ona, she; ono, it; mi, we; vi, ye; oni, onye, they*. The first 10 numerals (masc.) are: *odin, dva, tri, tchetire, pyat, shest, sem, osm* (or *vosm*), *devyat, desyat*. The perfect of the verb *bit(y)*, to be, is—sing.: *ya bil*, I have been, *ti bil, on bil, ona bila, ono bilo*; pl.: *mi bili, vi bili, oni and onye bili*.—Among the best grammars of the Russian language are those of Heym, *Russisch Sprachlehre für Deutsche* (3d ed., Riga, 1804); Vater, *Praktische Grammatik der Russischen Sprache* (2d ed., Leipsic, 1814); Schmidt, *Praktische Russische Grammatik* (Leipsic, 1813); Tappe, *Neue Russische Sprachlehre für Deutsche* (3d ed., St. Petersburg, 1820); Gretch, "Complete Russian Grammar" (2d ed., St. Petersburg, 1830; German ed., by Oldekop, *Grundregeln der Russischen Sprache*, 1828; French ed., by Reiff, *Grammaire raisonnée de la langue Russe*, 1828); Langan, *Manuel de la langue Russe* (St. Petersburg, 1825); Noakoffski, *Gramatika Rossiyskaya* (Leipsic, 1836); and Vostokoff (7th ed., St. Petersburg, 1848); beside the grammar published by the academy of St. Petersburg (1802). In English there are a "Russian Grammar for Englishmen" (St. Petersburg, 1822), and Heard's "Practical Grammar of the Russian Language" (2 vols. 8vo., St. Petersburg, 1827). The best dictionaries, beside that of the academy (4 vols., 1847), are those of Heym, *Russisch-Deutsches und Deutsch-Russisches Wörterbuch* (Riga, 1795-8; Russian, German, and French

ed., Leipsic, 1844); Tatishtcheff, *Nouveau dictionnaire Français-Russe* (2 vols., Moscow, 1832); Oldekop, *Russisch-Deutsches und Deutsch-Russisches Wörterbuch* (last ed., St. Petersburg, 1843); and Sokoloff (St. Petersburg, 1834). There is an English-Russian grammar and dictionary by Constantinoff (3 vols. 8vo., London).—The first germs of literary life in Russia appear in the time of the foundation of the empire by the Varangians, and of the introduction of Christianity by Vladimir the Great. The Varangians adopted the language of the conquered Slavi, and only a few words in the present Russian language show traces of their influence. The Slavic translation of the Bible and the introduction of old Slavic liturgical books by Cyril and Methodius led to the general adoption of the old Slavic as the written language, while the common Russian language maintained itself only in the mouth of the people. No monuments whatever are left to show the condition and growth of the Russian language at this early stage of its history; even the popular songs which elucidate the beginning of many other literatures, have reached us only intermixed with later alterations. In the old Slavic language we have the treaties of the princes Oleg and Igor with the Greeks of the years 912 and 945, and an address of Svatoslav; but whether their origin really belongs to this ancient time is uncertain. An important old Slavic work, *Pravda ruskaya* ("Russian Law"), which was composed during the reign of Yaroslav (about 1020), was discovered in 1738 by Tatishtcheff, and published by Schlözer (St. Petersburg, 1767), and by Rakoviecki (2 vols., Warsaw, 1822). Nestor, the father of Russian history, belongs to the same period. The rule of the Mongols over Russia interfered but little with the growth of Russian literature, for the conquerors spared the convents, in which science found a safe refuge. Among the few works of this period which have been preserved are the "Annals" of Simon, bishop of Susdal (died 1226), a work of the metropolitan Cyprian (died 1406), a part of the "Sophia Chronicles" from 862 to 1534 (published by Stroyeff, Moscow, 1820-'22), and a considerable number of fables and tales, mostly centring round Vladimir and his knights, and bearing great resemblance to the tales of the round table. A good collection of these old Russian poems has been published by Prince Tzerteloff (2 vols., St. Petersburg, 1822); the most celebrated of them, "The Expedition of Igor against Polotzk," written about 1200, was discovered in 1795 by Count Mussin Pushkin at Kiev, and has since been often published (with a German translation by Hanka, Prague, 1821). The long duration of the rule of the Mongols caused a number of Mongol words to be received into the Russian language, which are still in use. After their expulsion Ivan III., Ivan IV., and especially Michael Romanoff, gave a new impulse to the progress of Russian literature, by establishing new schools, encoura-

ging scholars, and calling distinguished foreigners into the empire. Among the authors of this period are the metropolitan Macarius (died 1564), who wrote biographies of saints, Russian divines, &c.; Tzitzania, who compiled a Slavic grammar (Wilna, 1596); and Matvieyeff, the author of several historical works. Nikon, the patriarch of Russia (died 1681), had the Bible translated into the Slavic language, and caused a revision of the Slavic liturgical books after the Greek originals, for which purpose more than 500 Greek manuscripts were collected by his order. But the great drawback to the rise of a truly national and popular literature, the use for literary purposes of another language than that of the people, was not removed until the reign of Peter the Great, under whom the intellectual condition of Russia underwent a revolution no less thorough than the material. He abolished the use of the old Slavic as the official language of the government, and took energetic steps for superseding it as the language of literature. He fixed the alphabet of the common Russian language, superintended at Amsterdam the casting of the first types, and gave to a printer of Amsterdam, who in 1699 published the first book in the Russian language, the monopoly of printing Russian books for 15 years. The first newspaper was established in Moscow in 1704, and the first in St. Petersburg in 1705. He instituted the Russian academy of science according to a plan of Leibnitz, but it was not opened until after his death, by Catharine I. (1725). The impetuosity with which Peter endeavored to give to his empire a literature did not leave him time to establish it on a native basis, and to cultivate the national resources; but the writers whom he urged on to write brought many foreign elements of a heterogeneous character into the rising literature. An Italian theatre was opened at the Russian court in 1730, and a German one in 1738. Among the principal authors of this time were Demetrius, metropolitan of Rostov (1651-1709), who wrote biographies of the saints (4 vols., Kiev, 1711-16); Theophan Procopovitch (1681-1736), metropolitan of Novgorod, who left about 60 theological and historical works; Stephen Yavorski (1658-1722), metropolitan of Riazan, and Gabriel Bushinski, distinguished pulpit orators; the monk Nicodem Selly (died 1746), who made valuable collections for Russian history; Basil Nikititch Tatishcheff (1686-1750), who wrote a history of Russia in 4 vols. which is still valued; Prince Cantemir, a satirical poet, who, in imitation of Horace and Boileau, castigated the errors of his times; the two Cossack poets Semen Klimoffski and Cyril Daniloff; the historian Prince Khilkoff (died 1718), who wrote a "Summary of Russian History;" Leont. Magnicky, the author of the first Russian manual of mathematics; Ivan Kyriloff, a statistician and geographer; and Basil Grigorovitch, the author of a journey to western Europe. Professor Trediakoffsky improved Russian prosody, and

introduced instead of the syllabic rhyme the measure of syllables; but he showed in his tragedy "Deidamia," and in his other poems, more learning than poetical genius.—The work commenced by Peter the Great was carried on with great vigor and success by the empresses Elizabeth and Catharine II. Elizabeth, who regarded art and science as the brightest ornaments of her court, founded in 1755 the university of Moscow, and in 1758 the academy of arts. Catharine II. added new and immense fields to the literary production of the country, by establishing throughout the empire public schools and thus increasing the literary wants of the people. She also established normal schools, liberally supporting the scholars, enlarged and patronized the academy of sciences and the academy of arts, and established in 1783 the academy for the perfection of the Russian language and history. At the head of the authors of this period stands Lomonosoff (died 1765), the father of modern Russian poetry. He wrote the first critical grammar of the Russian language, was the first to write pure and genuine Russian prose, and is still unsurpassed in Russian literature as a lyric poet. The first dramatic writer of note was Sumarokoff (1727-'77), who with almost equal success wrote also historical and other poetical works. For the exhibition of his dramas national theatres were established at St. Petersburg (1756) and Moscow (1759). Among the other distinguished poets of this time were Kheraskoff (1733-1807), one of the most prolific writers of Russia, whose epopees "Rossiada" (1785) and "Vladimir" (1786) have still many readers; Petroff (1756-'99), whose odes are distinguished for fulness and vigor of thought, though less for purity of style; and Bogdanovitch, whose romantic poem *Dushenka* has become one of the favorites of the nation. Gabriel Romanovitch Derzhavin (1743-1816), the Russian Anacreon, exhibited a greater originality than any of the preceding poets. His lyric, didactic, and dramatic works still hold a high rank in Russian literature, and his "Ode to God" has been translated into most living languages. Vizin (1745-'92) was particularly successful as a writer of comedies, some of which, as his *Nedorosl*, are still valued; he was also the best prose writer of this period. Kapnist as a lyrical poet equalled Derzhavin in tenderness and purity of language, and was his superior as to poetical genius. His tragedy "Antigonus" (1815) and his comedy "Abied" were also well received. In dramatic poetry Kniazhnin (1742-'91) is almost the peer of Sumarokoff. Count Khvostoff deserves an honorable mention for his comedies, and Bobroff (died 1810) for his didactic poem *Kherasonida*, which, though in the main very bombastic, is full of sparkling thoughts. Prince Dolgoruki (1754-1823) wrote philosophical odes and epistles noted for depth of feeling. Levanda, archpriest at Kiev (1736-1814), was one of the best pulpit orators, distinguished for vigor of thought. Platon, metropolitan of

Moscow, wrote numerous works on ecclesiastical history. The historical literature received valuable contributions from C. F. Müller, a Westphalian (1705-'83), who edited many manuscripts of historical works and established the first literary gazette (1755). A "History of Russia" in 15 vols. was written by Shtcherbatoff (1733-'90), and another in 3 vols. by Yemino. Boltin (1735-'92) wrote a number of thorough and critical essays on the ancient history of Russia; Tchulkoff, a "History of Russian Commerce;" Golikoff, "Collections for a Biography of Peter the Great;" and Plestcheyeff, "Statistics of Russia." Nikititch Muravieff (1757-1807) wrote many pedagogical, moral, and historical essays, all of which exhibit depth and nobility of feeling, keenness of thought, and an accomplished style. Novikoff (1744-1818) founded a typographical society, and established a satirical journal ("The Painter") which had considerable influence in literary circles. The critical study of the Russian language was greatly promoted by a "Comparative Dictionary of the Russian Language" (St. Petersburg, 1787-'9), for which Catharine II. herself drew up the plans.—The history of Russian literature in the 19th century is one of steady progress. Alexander I. was a liberal patron of all literary men and institutions; he increased the number of universities, established many new literary institutions, and founded in 1802 a special state ministry for national literature and popular enlightenment. Under Nicholas I. Russian literature emancipated itself fully from the controlling influence of foreign elements, assumed a thoroughly national and genuinely Slavic character, and received new inspiration from the rise of the Pan-Slavic movements in politics and literature, in which Russia as the foremost representative of the race seemed to be required to play a prominent part. The new period of Russian literature beginning with the 19th century was opened in a worthy manner by Nicholas Karamzin, the Russian Livy (1765-1827), who delivered the Russian prose from the dominion of bombast, and set a brilliant example of a plain, flowing, and sprightly language, especially in his chief work, a "History of Russia" in 11 vols. He seems to have taken Wieland as a model. Many of his followers even outdid him in imitating the German classics, and there was danger of Russian literature becoming Germanized, when a reaction arose through Shishkoff (1754-1841), minister of national enlightenment, and a distinguished poet, philologist, and translator. The old Russian and national tendencies found a centre in the "school of Moscow," while, on the contrary, the St. Petersburg school was less exclusive with regard to foreign literatures. The victory of the national tendencies is in great part due to the genius of Alexander Sergeievitch Pushkin (1799-1837), whose poems afford a faithful and patriotic reflection of Russian life, which forms the subject of nearly all his works. He is, in particular, the founder of the national tragedy ("Boris Godunoff,"

1831), for which he used, following the example of Zhukoffski, the iambic metre, which was adopted by many, although others retained the Alexandrine verse. Zhukoffski himself (1783-1852) belongs among the greatest poets of Russia. He was an imitator of Schiller and Byron, the founder of a romantic school, and distinguished himself in almost every kind of poetry. Dmitrieff (1760-1837) distinguished himself equally in satire, epistle, hymn, and epigram. Among the followers of Pushkin must be named Baratynski (died 1844), Delvig (1798-1831), Benedictoff, and Podolinski. One of the favorite lyric poets of modern times is Lermontoff (1811-'41), whose works have been translated into many other languages (into German by Bodenstedt). Other lyric poets of distinction are Viazemski (born 1792), a writer of elegies, also a good critic; Gneditch, an excellent translator of the Iliad, "King Lear," and other foreign poetry; Vostokoff, Pnin, Sumarokoff, Burinski, Davidoff, Milonoff, Satroff, Gortchakoff, Panayeff, Anna Petrovna Bunina, and the countess Rostopchin. Among the dramatic poets of distinction was Ozeroff (1770-1816), who was the first to fully comprehend the essence and objects of dramatic poetry. His tragedies ("Oedipus," "Fingal," "Dmitri Donskoy," &c.) are written in the Alexandrine verse; and although the language is not pure, and the structure of the verse is frequently heavy, these faults are fully outweighed by the vigor of thought and expression. Prince Shakhoffski (died 1846), the author of many operas and comedies, is one of the best comic poets of Russia; inferior to him is Glinka. Among the more recent dramatic poets, Polevoy and Kukolnik, both of whom took the subjects of their dramas from Russian history, are the most important. Gogol in his comedies and novels pictured with great talent the manners of the petty towns of Russia. Professor Mersliakoff, of Moscow, gained a high reputation both as poet and critic; and General Davidoff was the author of very popular soldiers' songs. The historical novel has been cultivated with particular success by Bulgarin, who, however deficient his works may be from an æsthetic point of view, has the merit of having first ventured to portray actual life. A profound knowledge of human character, with a very skilful delineation of individual traits, is found in Pavloff's works. Sagoskin, an imitator of Walter Scott, pictured the life of the lower classes, and Count Solohub that of the higher classes of St. Petersburg. Other distinguished writers in this branch of literature are Ushakoff (*Kirgeez-Kaisack*, German translation by Goldhammer, 2 vols., Leipsic, 1834), Prince Odoyeffski, Baron Korff, Masalski, Senkoffski, and Dahl. The idyllic life of the Cossacks was represented with great freshness and talent in the works of Gogol, Grebenko, and Kvitka, some of whom used the language of Little Russia (the Ruthenian language). Collections of popular tales and songs, to which in Russia as in all Slavic countries great attention is paid, were

made by Novikoff, Kashin, Maximovitch, Makaroff, and Sakharoff. Brilliant orators were Podobiedoff, Desnitzki, Drozdoff (archbishop of Moscow), and Protasoff. Among the prominent historians are the church historian Bolkhovitinoff (1767-1837), metropolitan of Kiev, and author of a work on "Literary Russia" (translated into German by Strahl, Leipsic, 1828); Bogush; Gretch, the editor of the first Russian cyclopædia; Ustrialoff, professor at St. Petersburg, whose "History of Russia" (3 vols., German translation, Stuttgart, 1840), which urges the gradual Russification of all the non-Russian tribes of the empire, has been officially introduced as a text book into the Russian colleges; Pogodin, the author of valuable critical works on the ancient history of Russia; Polevoy ("History of Russia"); Berg ("Lives of Russian Czars"); and Danileffski, the author of some able though partial works on the French-Russian war. Able historical investigations have also been made by Sniegireff, Stofftsoff, Srezneffski, Semailoff, the academicians Zoloffeyff and Stroyeff, Neveroff, and Arsenyeff. Important works on diplomatics have been written by Kamenski and Malinoffski, on bibliography by Köppen and Buturlin, on statistics by Hermann and Ziabloffski. Works on the grammar and history of the Russian language were written by Podsiyaloff, Sokoloff, Born, Nikolski, Heym, Mussin-Pushkin, Kalaidovitch, and Stroyeff. Philosophical studies are still in their infancy, and mostly leaning on modern German philosophy. Works have been written by Golubinski, Velanski, Sidonski, Kodroff, and others. Scientific theology is cultivated still less. Stourdza has published a work on the doctrines of the Russian church, Muralt one on liturgies, &c. A "Cyclopædia of Law" has been written by Nevolin, a "History of Russian Law" by Moroshkin, and a work on the relation of Russia to Roman law by Kryloff. Valuable works on natural sciences have been written by Pavloff, Maximovitch, and Spaski.—See Otto, *Lehrbuch der Russischen Literatur* (Leipsic, 1837; translated by Cox, Oxford, 1839); Jordan, *Geschichte der Russischen Literatur* (Leipsic, 1846); and Talvi (Mrs. Robinson), "Historical View of the Languages and Literature of the Slavic Nations" (New York, 1850).

RUSSIAN AMERICA, that portion of the American continent lying N. of lat. 54° 40' N. and W. of long. 141° W., with the islands adjacent, together with a narrow belt of rocky coast and a number of islands lying between lat. 54° 40' and 60° N.; area, 871,875 sq. m.; pop. 10,723 whites, partly of Russian or Siberian descent, and 40,000 to 50,000 Indians. The islands are very numerous, and many of them uninhabited, the principal groups forming the Aleutian archipelago. The most important are Prince of Wales island, Baranov or Sitka, Kodiak, Unimak, Nunivak, and St. Lawrence. The peninsula of Alaska extends westward to about long. 163° W. The surface along the coast is very mountainous, several of the peaks, some

of them volcanic, attaining an altitude of 15,000 to 17,500 feet, and the coast range being generally 10,000 feet high. The interior is little known; there is a range of mountains, 200 or 250 m. back from the coast, a continuation of the Sierra Nevada, and a third range extending inward from Cape Lisburne, above Behring's straits. In the S. part there are extensive sounds or friths, lying between the islands and the coast, and navigable for large vessels to a considerable distance in the interior. The rivers are the Kuskokvim and the Kvikhpak, flowing into the Kamtchatka sea; the Yukon, with several affluents, which flows into Behring's straits; and the Colville, which flows into the Arctic ocean. The climate of the greater part of the country is intensely cold, and the soil sterile. In the south some of the narrow valleys are productive. The pine attains a great height on the low hills, and the fir and alder are abundant. Most of the vegetation is alpine in character. The country is mainly valuable for the products of its fisheries and its furs. Its principal town, New Archangel (pop. about 1,500), is situated on Sitka island, has a good harbor, and is the head-quarters of the Russian American fur company, which employs 50 or 60 vessels in the collection and transportation of furs.

RUST, the hydrated oxide of iron which collects as a stain, increasing to a scale, upon the surface of iron or steel exposed to any oxidizing agent, as a damp atmosphere, acid vapors, &c. Its composition varies with the extent to which the oxidation has gone on. As it continues to form it eats into the metal, removing it in successive layers. The action is checked by keeping the metallic article in pure dry air, or by covering it with paint or with other coating that prevents access of the air. Rust often produces yellow stains upon textile fabrics which are difficult of removal. The common acids, as hydrochloric or sulphuric diluted with water so as not to injure the fabric, are not always successful in dissolving the oxide of iron. Oxalic acid is often resorted to, and, at a high temperature, also the binoxalate of potash. But if soap has been applied an oleate of iron is apt to be produced, which it is exceedingly difficult to dissolve. The ferrocyanide of potassium is then the best solvent. It should be added in small quantity to water acidulated with sulphuric acid, and the article should be moved about in the liquid. The fabric becomes blue, and is to be rinsed out and treated with solution of carbonate of potash, and finally washed with dilute sulphuric acid.

RUSTCHUK, a fortified town of European Turkey, in Bulgaria, situated on the right bank of the Danube, nearly opposite Giurgewo, and between Silistria and Sistova; pop. about 30,000. It is the seat of a Turkish pasha and of a Greek archbishop, but is poorly built, and important only as a military point, though even in that respect inferior to most of the Bulgarian fortresses on the line of the Danube.

**RUTA BAGA**, or **SWEDISH TURNIP**. See **TURNIP**.

**RUTH**, **BOOK OF**, one of the canonical books of the Old Testament. By many ancient and modern writers it has been regarded as an addition to the book of Judges, because the transactions which it relates happened in the time of the judges of Israel. (Ruth i. 1.) The book contains the history of Ruth, a Moabitish woman, who, after the death of her husband, a Hebrew emigrant from Judæa, left her home, and followed her mother-in-law Naomi to Bethlehem, where a relative of her deceased husband, Boaz, attracted by her loveliness, married her. She was the mother of Obed, whose son Jesse was the father of David. The mention of David, and of comparatively late national customs (as in iv. 7), and the occurrence of Chaldaisms, are sufficient proofs that this book was composed in the times of the Hebrew monarchy. Its canonical authority has never been questioned.

**RUTHENIUM**, one of the metals found in connection with platinum, and first made known by M. Klaus in 1844. It is remarkable for its very refractory nature, exceeding in infusibility all other metals, except osmium. The metal is oxidized by fusion with nitre or with caustic potash. It is hard and brittle like iridium, with which it presents many analogies. Its specific gravity, however, 11 to 11.4, is only one half that of iridium. Its alloy with zinc is inflammable; with tin it forms cubical crystals of beautiful lustre.

**RUTHERFORD**. I. A. S. W. co. of N. C., bordering on S. C., and drained by the head waters of Broad river, a branch of the Congaree; area, about 850 sq. m.; pop. in 1860, 11,573, of whom 2,391 were slaves. It has a hilly surface, and but a portion of the soil is fertile. The productions in 1850 were 472,335 bushels of Indian corn, 29,384 of wheat, 76,681 of oats, 8,162 lbs. of tobacco, and 188 bales of cotton. There were 7 grist mills, 4 saw mills, 6 tanneries, 46 churches, and 4,800 pupils attending public schools. Capital, Rutherfordton. II. A central co. of Tenn., intersected by Stone's river, a branch of the Cumberland; area, about 550 sq. m.; pop. in 1860, 27,918, of whom 12,984 were slaves. It has a diversified surface and a very fertile and well cultivated soil. The productions in 1850 were 1,667,320 bushels of Indian corn, 181,461 of oats, 83,123 of sweet potatoes, 14,070 bales of cotton, 169,047 lbs. of tobacco, and 39,064 of wool. There were 3 grist mills, a cotton factory, 6 tanneries, 2 newspaper offices, 54 churches, and 1,673 pupils attending public schools. It is intersected by the Nashville and Chattanooga railroad, which passes through the capital, Murfreesborough.

**RUTLAND**, a W. co. of Vt., bordering on N. Y., from which it is separated partly by Lake Champlain, and drained by Black, White, Quechee, and Paulet rivers, and Otter creek; pop. in 1860, 35,949. It has an elevated surface, in some parts mountainous, and a fertile soil.

Iron ore abounds, and a range of marble quarries extends along its whole length. The marble as well as the iron is of excellent quality. The productions in 1850 were 25,874 bushels of wheat, 258,831 of Indian corn, 183,706 of oats, 416,000 of potatoes, 623,199 lbs. of wool, 1,280,814 of butter, and 1,930,047 of cheese. There were 9 grist mills, 33 saw mills, 5 iron foundries, 1 rolling mill, 2 cotton and 11 woollen factories, 18 tanneries, 3 newspaper offices, 60 churches, and 9,395 pupils attending public schools.—**RUTLAND**, the capital, is pleasantly situated on Otter creek; pop. in 1860, 7,577. It has an active trade, with superior facilities, being the concentrating terminus of 4 important railroads: the Rutland and Burlington, running N. 67 m.; the Bellows' Falls, S. E. 52 m.; the western Vermont, connecting with Troy, N. Y.; and the Rutland and Washington, also connecting with Troy. The township is divided into 2 parishes, the East and West. In the West parish are two villages, West Rutland and Gookin's Falls. Rutland village, the principal place, is in the East parish. It contains 2 court houses, a gaol, a bank, 6 marble mills, 2 extensive furniture factories, 2 newspaper offices, 6 churches, and a number of manufactories and mills, among which is one of considerable extent for sawing marble.

**RUTLANDSHIRE**, an inland county of England, bounded by Lincolnshire, Northamptonshire, and Leicestershire; area, 150 sq. m.; pop. in 1851, 22,983. The scenery is beautiful, and the soil fertile. It is the smallest county in England, but is remarkable for the quality of its wheat and cheese.

**RUTLEDGE**. I. JOHN, an American statesman and jurist, of Irish parentage, born in Charleston, S. C., in 1739, died in July, 1800. He studied law at the Temple in London, returned to Charleston in 1761, and attained the foremost rank as an advocate. He was a leading member of the stamp act congress at New York in 1765, and of the South Carolina convention in 1774, by which he was chosen one of the delegates to the general congress at Philadelphia. He successfully resisted the attempt to limit the powers of the delegates, and, when it was asked what should be done with them if they betrayed the interests of the colony, replied: "Hang them, hang them!" In the congress he sustained the boldest measures, and was pronounced by Patrick Henry the greatest orator there. He was reappointed to the congress of 1775; and in 1776, in the convention of South Carolina, he was chairman of the committee which prepared the constitution, and was without opposition elected president of the new government. When Fort Moultrie was attacked by the British in June, Rutledge, against the advice of Gen. Lee, sent to it 500 pounds of powder, and directed Col. Moultrie not to evacuate it without an order from him, adding: "I would sooner cut off my right hand than write one." When the constitution was altered by the legislature in

1778, he refused his sanction and resigned; but on the approach of the British army in the following year he was chosen governor (which title had been substituted for that of president), and when Charleston was threatened with a siege was clothed by the legislature with dictatorial power. He took command of the militia, and made every effort to strengthen the defences of the town; but, when summoned by Gen. Prevost to surrender (May, 1779), the negotiations were protracted as long as possible, and an offer was finally made to capitulate on condition that South Carolina should remain neutral during the war. This was rejected, and the British soon after retired on the approach of Gen. Lincoln. When Charleston fell a year later, Rutledge retired to North Carolina, and for nearly two years accompanied and aided the southern army. In Jan. 1782, Charleston being still held by the British, he convened the general assembly at Jacksonborough, retired from office, and was soon after elected to congress. In March, 1784, he was chosen chancellor of the state, and while holding that office became a member of the convention for framing the federal constitution, in the elaboration of which he bore a prominent part, and in the state convention strongly supported its ratification. In Sept. 1789, he was appointed an associate judge of the U. S. supreme court, which office he resigned in 1791, when he was elected chief justice of South Carolina. In July, 1795, President Washington appointed him chief justice of the United States, and he presided at the succeeding term of the supreme court; but the senate on assembling in December, for political reasons, refused to confirm the appointment. Previously, however, an attack of sickness had deprived Rutledge of his reason, in which condition he remained till his death. II. EDWARD, an American statesman, and a signer of the declaration of independence, brother of the preceding, born in Charleston, Nov. 23, 1749, died Jan. 23, 1800. He also studied law at the Temple in London, commenced practice at Charleston in 1773, and was in 1774 the youngest member of the congress, in which body he served 3 years. In June, 1776, he was appointed a member of the first board of war, and in September was associated with Dr. Franklin and John Adams as a committee to confer with Lord Howe on Staten island, at his request, as to terms of accommodation. In 1779 he was again appointed to congress, but was prevented by illness from taking his seat; and in the same year he commanded an artillery company in the militia force which dislodged the British from Port Royal island. During the siege of Charleston in 1780, being despatched to hasten the march of troops to its relief, he was taken prisoner and detained for 11 months at St. Augustine. In 1782 he was a member of the general assembly at Jacksonborough, and supported its bill of pains and penalties for confiscating the property of tories,

which had been recommended by his brother in convening the assembly, but which was afterward repealed. In the legislature of 1791 he drew up the act for the abolition of the rights of primogeniture. From the close of the revolution he had devoted himself mainly to the practice of his profession, serving in the legislature, but declining an offer of a seat on the bench of the U. S. supreme court. In 1798 he was elected governor of the state, but died in the middle of his term. III. HUGO, an elder brother of the preceding, died in Jan. 1811. In 1776 he was appointed judge of the court of admiralty of South Carolina, in 1777 was speaker of the legislative council, and from 1782 to 1785 of the house of representatives, having in 1780 shared his brother's captivity at St. Augustine. From 1791 till his death he was chancellor of the state.

RUTULI, a people of ancient Italy, on the coast of Latium. In Virgil, King Turnus of the Rutulians is mentioned as an enemy of Latinus, who gave his daughter Lavinia, previously promised to Turnus, in marriage to Æneas. It is generally believed that they were a tribe of Pelasgians, who at a later period fused with the Latins. Their name disappears from history after the time of the Roman kings. Their chief town was Ardea, which in 440 B. C. became a Roman colony.

RUXTON, GEORGE FREDERIC, an English traveller, born in 1820, died in St. Louis, Mo., Sept. 29, 1848. At the age of 17 he left the military college of Sandhurst to enlist in the Spanish army against Don Carlos, and rendered valuable services. On his return to England in 1839 he received a commission as lieutenant in the 89th regiment, with which he went to Canada, but soon resigning spent some years among the Indians and trappers of western America, whose lives and characters are graphically depicted in his "Adventures in the Rocky Mountains and Mexico," and "Life in the Far West." He afterward made journeys to N. and S. Africa, and to Mexico, and in 1848 again started from England for the Rocky mountains, but only succeeded in reaching St. Louis when he died.

RUYSBROEK, JOHANNES, called *doctor divinus*, or *doctor ecstaticus*, a mystical writer of the middle ages, born in the village of Ruysbroek, near Brussels, about 1293, died Dec. 13, 1381. At the age of 24 years he was ordained priest, and remained a member of the secular clergy until his 60th year. He then retired with several friends into a cloister near Brussels, and soon after became the superior of a congregation of regular canons. His mystic writings and the sanctity of his life were widely celebrated. He affirmed that all he had written he had derived from inspiration of the Holy Ghost. Not being well versed in Latin, he wrote all his works in Flemish. There is a Latin translation by Surius (Cologne, 1552, 1609, 1692), and a German one by Arnold (Offenbach, 1701).



**RUYSCH, FREDERIK**, a Dutch anatomist, born at the Hague, March 23, 1638, died Feb. 22, 1731. He studied anatomy and botany at Leyden and at Franeker, and in 1665 was chosen professor of anatomy at Amsterdam. He made many discoveries in the science of anatomy, and invented the means of preserving dead bodies by injections into the blood vessels. His skill in the preparation of specimens was very great. His anatomical collection was purchased by Peter the Great of Russia for 30,000 florins, and a second collection was sold to the king of Poland for 20,000 florins. In 1685 he was made professor of medicine. In 1727, upon the death of Sir Isaac Newton, he was elected a foreign associate of the academy of sciences at Paris. His various anatomical works were printed collectively (4 vols. 4to., Amsterdam, 1737).

**RUYSDAEL, JACOB**, a Dutch painter, born in Haarlem about 1635, died there in 1681. He was educated to be a surgeon, but after a brief practice of his profession renounced it for that of a painter. He was the intimate associate of Nicholas Berghem, and is said to have studied under him, which, however, owing to the dissimilarity of their styles, is not probable. He rose to great distinction as a landscape painter. His coloring is that of a northern climate, and the character of his skies and other features in his pictures seem to indicate that he never went further south than the northern borders of Germany, although he is said to have painted in Italy. The figures in his pictures were executed by Ostade, Wouwermans, Berghem, and others of his contemporaries. He also painted sea pieces.

**RUYSSELEDE**, a market town in West Flanders, Belgium, 14 m. S. S. E. from Bruges, principally remarkable as the seat of the great government reformatories of Ruysselede and Beernem. The first is intended for pauper, vagrant, and vicious boys, the second for girls of the same class, and both are under a common direction. These schools were established by a royal decree issued in 1848, that for boys being organized in 1849, and that for girls in 1853. The boys' reformatory receives young paupers under 16, who present themselves voluntarily, with a certificate from the municipal authority of their place of settlement, or from the provincial authority; children sentenced by a commissioner for begging or vagrancy; children acquitted of criminal charges on the plea of having acted without discernment, but detained for reformation; and children of the poor not guilty of any misdemeanor. This reformatory occupies the buildings of an old sugar manufactory; the pupils number about 600. The whole management of the reformatory is military, the buildings forming the barracks. The boys are in 6 divisions of 100 each, superintended by overseers who have been educated for their work. Each division is composed of two sections, each under the management of a chief and sub-chief, selected from the boys

themselves for good behavior, and subject to the overseer; and in each section are monitors, also selected from the boys for good conduct, and separately trained. A farm of about 500 acres is attached to the reformatory, and every description of farm labor is conducted on the premises. There are also workshops, in which most trades are taught; but owing to the shortness of their stay, and their partial occupation in farm work and study, the boys seldom become skilled workmen. The decks, bulwarks, masts, and rigging of a ship have also been erected on the grounds, and the boys who have a preference for it are instructed as sailors. Instrumental music is taught, and many of the boys are received into the regimental bands of the army. The institution is successful in a pecuniary sense, fully sustaining itself after the first outlay of government in the purchase and fitting up of the grounds. The expenses for maintenance, salaries, &c., are very small, the board of the children costing only 5 cts. per day per head, and the entire expense per head only 10 cts. per day. The highest salary paid, that of the director, is \$772 per annum and his house, while the other teachers receive from \$232 and board down to \$80. The demand for the boys as apprentices is greater than the supply; and the number of children discharged who subsequently turn out badly has been less than 10 per cent. Discipline is maintained rather by loss of position, loss of honors, and moral disgrace, than by physical punishment. In the girls' reformatory, with about 800 inmates, washing, baking, mending, and making of clothing are carried on. In both establishments the rule is observed to produce as far as possible all that is used, rather than to purchase or sell the products manufactured. The girls' reformatory is under the charge of sisters of charity, but is conducted in most respects like the boys', except as regards military discipline.

**RUYTER, MICHAEL ADRIAENSZON DE**, a Dutch admiral, born at Flushing, Zealand, in 1607, died in Syracuse, Sicily, April 29, 1676. He was apprenticed by his parents to a shoemaker at the age of 11 years, but ran away and engaged as cabin boy, rising from a common sailor to the highest rank. When in 1641 Holland undertook to assist Portugal against Spain, De Ruyter, who had then attained the rank of rear admiral, commanded the Dutch fleet. In 1647 he attacked and sunk an Algerine squadron of 4 times the number of vessels he commanded off the port of Salé. In 1652, England and Holland being at war, while convoying a fleet of merchantmen, he met the English fleet off Plymouth, and beat them off, saving his entire convoy. During the next two years he commanded a division of the Dutch fleet under Admiral Van Tromp, and fought two naval battles, one of which was successful. In 1655 he was again sent against the Algerine pirates, whom he chastised terribly, hanging at the yardarm the famous renegade, Armand de Diaz. In 1659 he was sent to the assistance of

Denmark against Sweden, and for his services the Danish king ennobled him and his whole family. In 1665, war having again broken out between England and Holland, he was put in command of the fleet, but Prince Rupert confined him to the Dutch coast. In July, 1666, he fought the English for 3 days in the Irish sea, and eventually withdrew, with a doubtful victory. The succeeding year he renewed the attack, ascended the Thames as far as the Medway, burned the shipping at Sheerness, and compelled England to sign a treaty of peace at Breda. The Dutch republic being again involved in war in 1671, with both France and England, De Ruyter was again put in command of the fleet, and in 1672 fought the combined fleet long and obstinately, but without decisive results. In 1675 he was sent to the Mediterranean to aid the Spaniards against the French, and in 1676 fought a desperate naval battle against a greatly superior French force under Admiral Duquesne off the E. coast of Sicily, and was finally worsted, and retreated with his fleet into the harbor of Syracuse. He himself lost both legs in the fight, and died of his wounds a few days after.

RYE (*secale cereale*, Linn.), the name of a valuable grain-bearing grass, closely allied to the wheat, but suited to soil and climates where that will not grow. Agriculturists make several varieties or kinds of rye, such as spring, winter, many-stalked, composite-headed, and broad-leaved, originating without doubt from one common stock. The stem or culm of rye is from 4 to 6 feet high, smooth, hairy toward the spike; its leaves 6 to 18 inches long, lance-linear, glaucous, rough above and on the margins, sheaths membranaceous, nerved, smooth, the ligule short and dentate; the spike 4 to 6 inches long, 2-sided, flattish, linear; spikelets 2-flowered and a rudiment of a third; glumes opposite, hairy at base; palea ventricose, 5-nerved, terminating in an acute awn; grain oblong, grooved on the upper side, hairy at the apex, dusky brown. Rye is found to grow best where silica abounds in the soil, and is accordingly adapted to thin and sterile plains. Good crops of rye have been produced from the same land for many years in succession, increasing rather than diminishing. As soon as the crop is off, the stubble should be ploughed in, by this means enriching the soil. Spring rye should be sown as soon as the land will permit, and winter rye a few weeks after the stubble has been turned under. Rye is sometimes sown at the last hoeing of Indian corn, which has been found to be a good practice where the land is flat or the soil tenacious and heavy. The quantity of seed to be sown may be stated at 2 bushels per acre, unless the grain is small, when 5 or 6 pecks will be sufficient. The return from an acre of heavy, sandy loam, previously planted with Indian corn and sown with 5 pecks of seed, has been as much as 29 bushels, and even 48 bushels have been raised on a single acre. Rye is gathered when the

straw turns yellow, the heads hang down, and the grain is hard; sometimes it is cut when the grain is in the milk, but care is then to be observed that it dry in the open air. In the northern parts of New England winter rye is often fit to harvest by the middle of July, spring rye being always later. Its hardness renders it valuable in high latitudes, being the prevailing grain in a great part of the northern temperate zone, extending to part of Siberia, and in the North American Russian possessions maturing in lat. 52° to 57° N.—The value of rye as an article of food may be ranked as next to that of wheat, although it contains a smaller quantity of nutritious matter. In portions of Europe it is regarded as of the utmost importance in domestic economy, and by the peasantry the bread made from it is considered the best to promote strength and muscular vigor. In the United States its meal is extensively used among farmers to mix with the meal of Indian corn, for making a wholesome bread. Rye is largely consumed in distillation. (See WHISKY.) As a food for domestic animals, in Belgium and Germany, bruised or coarsely ground rye is mixed with peas or tares and formed into a coarse kind of bread, and this is found to succeed even in fattening. For feeding or soiling sheep and milch cows, the young herbage of rye is adapted as an early spring food, while the utility of the ripened straw in the manufacture of straw plait is well known. Long and clean rye straw is also used in making coarse mats for screening hot-beds and frames, and for stuffing horse collars, or even for thatching. According to Boussingault the average proportion of the grain to the straw is from 45 to 100, though Burger and Schwertz, make it from 41½ to 100. The grain of rye is subject to a peculiar disease known as ergot. Such rye is termed spurred, and is the *secale cornutum* of the pharmacopœia. (See ERGOT.)—The origin of rye is involved in the greatest uncertainty. Distinct species of grain are now known to have been the subjects of cultivation where rye is mentioned by the ancient writers, especially by those of the Sacred Scriptures and of the East. It is also inferred that it was little used as an agricultural cereal in ancient Greece or Italy. According to Pliny, however, it was cultivated as a fodder and for its grain by the Taurini, who occupied that part of Gaul now known as Piedmont. In Britain, as appears from ancient rents, rye was cultivated at an early period, and a practice long prevailed of sowing rye and wheat together.

RYE GRASS. See DARNEL.

RYERSON, ADOLPHUS EGERTON, D.D., LL.D., a Canadian clergyman, born in Charlottetown, Talbot district (now Norfolk co.), Upper Canada, March 24, 1803. His father, Col. Joseph Ryerson, was a half-pay officer in the British service in the American revolution, and emigrated to New Brunswick, and afterward to Canada, in 1788. The son became a

teacher, in 1825 was ordained deacon in the Methodist Episcopal (now the Wesleyan Methodist) church of Canada, and for the 4 years following officiated as an itinerant minister. In 1829, after the Methodist church of Canada became independent, he aided in establishing, and for several years edited "The Guardian," its official organ. In 1833 and in 1836 he was sent as a delegate to the British conference, and in 1841 was appointed principal of the university of Cobourg. In 1844 he was appointed by the governor-general superintendent of public schools for Upper Canada, a position which he still holds. The next year he spent in the United States studying the methods of public elementary education. In 1849 he published an extensive report of his tour, and submitted to the government a bill for the organization of the public school system, which now forms the basis of the Upper Canada common school system. Dr. Ryerson is now (1861) preparing a history of Canada, and of the "United Empire Loyalists."

RYLAND JOHN, D.D., LL.D., an English Baptist clergyman, born in Northampton, Jan. 29, 1753, died in Bristol, May 25, 1825. He was remarkable for his attainments even in his early childhood, having learned his letters before he could speak, reading the Psalms in Hebrew at 5 years of age, and having read through the Greek Testament before he was 9. In 1770 he preached before the Baptist congregation at Northampton, and for the next 5 years assisted his father in his school, and preached occasionally. In 1776 he became pastor of the Northampton congregation, but continued for a number of years to teach. In 1791 he wrote the circular letter which led to the formation of the English Baptist missionary society, in whose organization he took part at Kittering in 1792. He was now called to Bristol as pastor of the Baptists in that city,

and president of the Baptist college, and retained both offices for nearly 33 years. In 1815, on the death of Andrew Fuller, he was chosen his successor as secretary of the Baptist missionary society. He published during his lifetime 34 volumes, mostly on theological topics, and contributed frequently to periodicals.

RYMER, THOMAS, an English author and antiquary, born in Yorkshire in 1638, died in London, Dec. 14, 1713. He became a member of Gray's Inn in 1666, and was appointed historiographer to King William in 1692. There was at the time a scheme on foot to publish the whole body of existing documents relating to state transactions between England and other countries, and Rymer was chosen to edit it. The result was the collection entitled *Fœdera, Conventiones, et cujuscunque Generis Acta Publica inter Reges Angliæ et alios Principes*, &c., commonly called "Rymer's Fœdera" (17 vols. fol., and 3 vols. added by Sanderson after Rymer's death). He also wrote a play entitled "Edgar, or the English Monarch," and a "Short View of Tragedy," which contains a ludicrous attack upon Shakespeare.

RYSWICK, or RYSWYK, a village of the Netherlands, province of South Holland, between the Hague and Delft, about 3 m. S. E. of the former place; pop. about 2,400. The place is renowned on account of the peace concluded there in 1697 by Louis XIV. of France on the one part and the German empire, England, Spain, and Holland on the other, which terminated the long and eventful war that followed the league of Augsburg in 1687. By that treaty Louis acknowledged William of Orange as king of Great Britain and Ireland, and restored his conquests in the Spanish Netherlands and in Catalonia to Spain, and others on the Rhine to the empire. A pyramidal monument commemorates the event.

RYTINA. See MANATEE.

## S

**S**, the 19th letter, 15th consonant, and chief *s*, sibilant in the English alphabet. It is a linguo-dental, and represents the hissing made by driving the breath between the end of the tongue and the roof of the mouth, just above the upper incisors. It is found in most languages, and is one of the most abundant consonants in English. Its sound varies, being strong, like *c* soft, in *this, sun*, and softer, like *z*, in *these, wise*. Among the Hebrews the tribe of Ephraim uttered *s* for the aspirated *sh*, which they could not articulate (Judg. xii. 6); and lisping, which is not uncommon, especially in children, consists in uttering the aspirated *th* for *s*. Its symbol in Hebrew signifies tooth, and in its original shape it may have represented 3 teeth, since in Hebrew, Greek, and Etruscan it consists of 3 strokes, which in al-

tered positions have the same relative situation to each other. In the Phœnician the angles are rounded, and approach the serpentine form of the Roman character.—In words common to the Greek and Latin, the latter language often has an *s* initial which is wanting in the former; thus *ἔξ, ἔπτα, ἡλιος, ὕδωρ, ὦλη, ὕς*, become *sex, septem, sol, sudor, sylva, sus*. Before words borrowed from the Latin having *s* initial, the French often prefix a vowel; thus *spiritus, spatium, spes*, become *esprit, espace, espérance*; and by an abbreviation *schola, scribere, status*, become *école, écrire, état*. In the middle of words the dropped *s* is replaced by a *^*; thus *tempestas, magister, bestia, epistola*, become *tempête, maître, bête, épître*; and the Italian *medesimo, testa, presto*, become *même, tête, prêt*. It is in like manner lost in many English

words, as *smelt, melt, stumble, tumble*. In several of the principal languages of modern Europe *s* final is the usual sign of the plural of nouns. It is subject to interchanges with *d*, *th* (*loves, loveth, hates, hateth*), *t* (Ger. *das, dass*, Eng. *that*), *s* (in the Somersetshire dialect of England; Dutch *zuster, zomer*, Eng. *sister, summer*), *sch* (Ger. *schlagen*, Eng. *slay*), *c*, *g*, *h*, *n*, and *r*.—As an abbreviation it stands for *societas* or *socius*, for the proper name Sextus, anciently for the numeral 7, for *solo* in Italian music, and for south in books of navigation and geography.

SA DA BANDEIRA, BERNARDO DE, viscount, a Portuguese statesman, born in 1796. He took an active part in the struggle for national independence against the French, participated in the revolution of 1820, left the country after the reaction of 1823, returned when Dom Pedro promulgated the new charter, was governor of Oporto during its long siege, and lost his right arm in an engagement there. In 1832 he was appointed minister of the marine and created a baron, but resigned in 1833. At the end of the civil war Dom Pedro created him a peer; he was again minister of the marine from Nov. 1835, to April, 1836, and was invested by the queen with extraordinary powers to put down the insurrection of March, 1837. In 1842 a new revolution deprived him of office; in 1846–7 he headed an insurrection against Costa-Cabral, was defeated and deprived of all his titles and dignities, but remained a member of the cortes. He subsequently again became minister of the marine, and is now a member of the council of state.

SAAD ED-DEEN, MOHAMMED EFFENDI, a Turkish historian, born early in the 16th century, died in Constantinople, Oct. 2, 1599. He was educated among the imperial pages under Sultan Selim I., and in 1573 was appointed by Selim II. preceptor to his son Amurath, the heir apparent. After the death of Amurath his son Mohammed III. intrusted him with the management of the most secret diplomatic relations of the empire. He attended the sultan in the Hungarian campaign of 1596, and in 1598 was made grand mufti. His principal work, entitled *Tadj al-Tovarikh* ("Crown of Histories"), is a copious history of the Turkish empire from its foundation to 1520. He also wrote the *Selim Nameh*, a collection of anecdotes of Selim I.

SAADI, SHEIK MOSLII EDDIN, a Persian poet, born in Shiraz toward the end of the 12th century, died in 1291, at the age of 102, or according to some authorities of 116 years. He studied at Bagdad, became a dervish, and during his life made 15 pilgrimages on foot to Mecca. He travelled in the East Indies, Egypt, and other countries, and fought against the crusaders in Syria, where he was taken prisoner. A merchant of Aleppo ransomed him and gave him his daughter in marriage, with whom he led an unhappy life. Finally, after 30 years' wanderings, he returned to Shiraz and built himself a hermitage, where he passed

his remaining years. He possessed great scientific knowledge, and, beside the principal oriental languages, was familiar with Latin. His collected productions comprise the *Gulistan* ("Flower Garden"), *Bostan* ("Fruit Garden"), *Pend Nameh* ("Book of Counsels"), and numerous gazels or odes, elegies, quatrains, and fragments in prose and verse. The two first mentioned works are the most celebrated. (See PERSIA, LANGUAGE AND LITERATURE OF, vol. xiii. p. 171.) The whole, in Persian and Arabic, edited by Harrington, were printed at Calcutta in 1791 (2 vols. small fol.); and of the *Gulistan* editions have been published with a parallel English translation by James Dumoulin (Calcutta, 1807), with punctuation and vowel marks by Dr. A. Sprenger (Calcutta, 1851), and with a vocabulary by Eastwick (Hertford, 1850), who translated it into English prose and verse (1852).

SAADIA, or SAADIAH (BEN JOSEPH), a Jewish philosopher, poet, and scholar, born in Fayoom, Egypt, toward the close of the 9th century, died in Babylonia in 941 or 942. He distinguished himself by writing against the sect of the Caraites, and in 928 became the leading teacher in the school of Sura in Babylonia. A dispute which soon after arose between him and Rabbi David was decided in favor of the latter by the divan of the caliph Muctadir Billah, and Saadia fled from the country; but a reconciliation having been effected, he re-occupied his chair in 937. He wrote in both Hebrew and Arabic, and occupies a prominent rank among the philosophical and theological writers of the nation by his poems on the laws and history of the Jews, by his Arabic translation of the Pentateuch, and principally by his celebrated treatise on "Religions and Doctrines," best known under its Hebrew title *Haemunoth vehaldeoeth*, in Rabbi Judah ben Tibbon's translation from the Arabic original (German translation by Dr. Fürst, Leipsic, 1845). A critical biography of Rabbi Saadia has been written by Rapoport (*Bikkure ha'ittim*, 1829), and a "Notice" by Munk.

SAAVEDRA, ANGEL DE. See RIVAS.

SAAVEDRA Y FAXARDO, DIEGO. See FAXARDO.

SABAISM (Ar. *tzaba*, to rise in splendor; Heb. *tzeba hashshamayim*, the host of heaven, the stars, *teebooth*, the heavenly hosts), the name given to the worship of the stars as deities. It extended through the countries of the Assyrian and Medo-Persian empires as far as Asia Minor, between the Caspian sea, the Euxine, and the Mediterranean, from the Armenian mountains as far as the banks of the Nile and southern Arabia; but it assumed different forms in different countries, appearing sometimes more sensual, sometimes more spiritual. The objects of worship were the sun, the moon, and the planets, or rather the planetary spirits of which the planets were believed to be the frame or the body. The worship of the sun was especially cultivated in Babylon and Phœnicia. The worshippers of the stars generally

ascribed to them a great influence upon and a knowledge of terrestrial affairs; and astrology, the casting of nativities, and various systems of demonology, were therefore the natural result of Sabaism. The astrological system was most largely developed by the Egyptians, while Parseeism was the purest and most perfect form of Sabaism. In the Koran the religion which was in opposition to that of Abraham, and in particular the star worship of ancient Arabia, is designated by the name Sabaism. In the town of Haran, in Mesopotamia, a kind of Sabaism maintained itself, surrounded on all sides by Christianity, until the middle ages. One sect of Sabaeans believed in the migration of the soul, and in great world-periods, constantly renewed in an everlasting revolution.

**SABBATH** (Heb. *shabbath*, day of rest), the name of the 7th day of the week among the Jews, dedicated to an entire cessation from worldly labor. It commenced on Friday evening, and extended to the evening following. Whether it was instituted by Moses, or of an ante-Mosaic origin, is a controverted point. An intentional violation of the sabbath was punished with death. In later times the provisions of the Mosaic law respecting the sabbath were greatly extended by the Jews; travelling was forbidden, and only "a sabbath day's journey" (2,000 paces beyond the limits of one's town or village) allowed. In the time of the Maccabees there were many zealous Jews who permitted themselves to be passively slaughtered by the enemy rather than defend themselves on the sabbath. Christ reproached the sect of the Pharisees for the stress they laid on a mere external strictness in observing the sabbath without corresponding sentiments. The *Mishna* enumerates 39 principal sorts of business which it is not allowed to perform on the sabbath, and each of them has again its subdivisions. Stated meetings for religious worship seem not to have been connected with the sabbath until the time after the exile. The sabbath before the passover was called the great sabbath. Every 7th year was called the sabbatical year, in which the fields remained uncultivated and debts could not be collected. The great majority of the Christian churches celebrate the first day of the week, Sunday, instead of the 7th (sabbath); but a few small denominations, as the Seventh Day Baptists, the adherents of Joanna Southcote, &c., maintain that the change was made without scriptural warrant, and therefore adhere to the religious celebration of the 7th day. (See **LORD'S DAY**.)

**SABELLIANS.** See **SABELLIUS**.

**SABELLIUS**, the originator of the heresy concerning the divine nature described in the history of the church as Sabellianism. Of his personal history it is only known that he was a native of Africa, a presbyter of Ptolemais, a city of the Libyan Pentapolis, and that he lived about the middle of the 3d century. His views concerning the divine nature and manifestation

were substantially those which Noëtus and Praxeas had already defended, but they gained significance from the subtlety and fulness with which he explained them. Holding to the strict unity of the being of God, he taught that the manifestation of God was a triad. God in himself is one, and remains ever so; but as he appears to the world he is three, or shows himself in three ways. These three forms of his appearing are not persons in the proper sense of that word, but only faces of the Deity. The manifestations of God in Christ and in the Holy Spirit are only temporary, and both the Logos and the Spirit will return finally into the Monad, or the Father. The three titles of Father, Son, and Holy Spirit, express only the threefold action of God in creation, redemption, and sanctification. Sabellius professed to believe that the Father and Son, God and the Logos, were the same in substance, but his doctrine took away all distinction. The most conspicuous opponent of Sabellius, through whom indeed the views of Sabellius and his party are best known, was Dionysius of Alexandria. In his controversy with Dionysius of Rome, while he pointed out sharply the distinction between the Son and the Father, which Sabellius destroyed, he went so far as to expose himself to the charge of denying their unity of nature. His hostility did not however prevent the Sabellian opinion from finding partisans. That in the 4th century the Sabellians were a flourishing sect, is evident from the statement of Epiphanius that they were to be found in considerable numbers, not only in Mesopotamia, but in the neighborhood of Rome. The council of Constantinople, in 381, by rejecting their baptism, testified to their importance. Augustine, a few years later, believed them to be extinct; but their opinions continued to flourish under other names. Marcellus and Photinus, in the 4th century, were only the first of a long line of eminent teachers who have sustained after Sabellius the theory of a trinity of offices rather than a trinity of persons in the Godhead. The doctrine of Sabellius is very fully discussed in the various histories of dogmas, especially by Martini, Möhler, Baur, Meier, Dorner, and by Schleiermacher in his treatise on the opposition between the Sabellian and the Athanasian theory of the Trinity.

**SABINA POPPÆA.** See **NERO**.

**SABINE**, a river which rises in Hunt co. in the N. E. of Texas, and after a S. E. course of about 250 m., when it reaches the E. boundary, runs in a generally S. direction with a curve to the E., forming the separating line between Texas and Louisiana, and entering Sabine lake near the coast, the entire length being about 500 m. It has numerous tributaries, but none of any considerable size; and being very shallow, especially toward the mouth, it is navigable only in some parts, and that for very small vessels.—Lake Sabine is a body of water lying between Texas and Louisiana, about 5 m. from the gulf of Mexico. It

receives the waters of the Sabine and Neches rivers, and is about 18 m. long by 9 broad.

**SABINE.** I. A W. parish of La., separated from Texas by the Sabine river and drained by a number of its tributaries, among which are the bayous St. Patries, San Miguel, Lenneau, and Torcau; area, about 1,800 sq. m.; pop. in 1860, 5,828, of whom 1,713 were slaves. It has a nearly level surface and fertile soil. The productions in 1855 included 301 bales of cotton and 91,542 bushels of Indian corn. There were in 1850, 6 churches, and 1,051 pupils attending public schools. Capital, Manny. II. An E. co. of Texas, separated from La. by the Sabine river, and drained by Patroon and Palo Gacho bayous; area, about 700 sq. m.; pop. in 1860, 2,750, of whom 1,150 were slaves. It has an undulating surface, covered with forests, and a very fertile soil. The productions in 1850 were 61,619 bushels of Indian corn, 19,920 of sweet potatoes, and 752 bales of cotton. There were 4 churches, and 92 pupils attending public schools. Capital, Milam.

**SABINE, EDWARD,** a British physicist of Irish extraction, born in England in 1790. He accompanied Ross and Parry in their first arctic expedition, and on his return presented to the royal society two papers, published in the "Philosophical Transactions" for 1819, containing his observations on the peculiar action of the magnetic needle in high latitudes. Promoted soon after to the rank of captain in the army, he prosecuted his investigations in terrestrial physics in a series of voyages from the equator to the arctic circle. In these investigations he determined the requisite length of the pendulum to beat seconds in different latitudes, and thus laid the basis for an accurate determination of the figure of the earth. The results were published in a 4to. volume in 1825, which, in consequence of some clerical errors, he afterward suppressed. In the intervals of his professional duty in Ireland, where he had been promoted to a majority, he continued his physical studies, and in 1836 communicated to the British association at Bristol some important observations on the direction and intensity of the magnetic force in Scotland. A year later he had extended his observations to numerous other points, and in 1838 he presented a memoir on the magnetic isoclinal and isodynamic lines of the British islands. His discoveries led to the establishment of permanent magnetic observatories in Great Britain and the colonies, the latter under his superintendence. He is now a major-general. He has been a fellow of the royal society since 1818, and its vice-president and treasurer since 1850. He has published in the "Transactions" of the royal society and the British association, and in the "Philosophical Magazine," numerous papers on meteorology, the pendulum, and magnetism, and has appended to the translations of Wrangel's expedition, and Humboldt's "Cosmos" and "Aspects of Nature," made by Mrs. Sabine, numerous valuable notes.

**SABINES,** an ancient people of Italy, embracing a large number of tribes conspicuous in the legends and history of Rome. They formed three principal groups: the Sabines proper; the Sabelli, divided into Vestini, Marsi, Marrucini, Peligni, Frentani, and Hirpini; and the Samnites. They were a migratory race, and early spread over the central and southern regions of the peninsula. They were renowned for bravery, rustic simplicity of manners, love of freedom, and religious character. In peace they were ruled by republican magistrates, in times of war by sovereign commanders, called by the Roman historians dictators or kings. The Sabines proper, the least warlike of all, inhabited a mountainous district in the central Apennines, situated between the rivers Tiber, Nar (now Nera), and Anio (Teverone), and surrounded by Latium, Etruria, Umbria, Picenum, and the territories of the Sabellians and Samnites. Their principal towns were Amitemum on the Aternus (Pescara), Cures, the birthplace of Numa Pompilius, Reate (Rieti) on the Nar, Nursia (Norcia), and Nomentum. The Sabines formed one of the constituent elements of the Roman people, a portion of them having become incorporated, according to the legend, with the subjects of Romulus on the termination of the war waged to revenge the rape of the Sabine women by the Roman youths. The remainder of the people continued independent, but at the beginning of the 3d century B. C. were finally merged in the Roman republic.

**SABLE,** a carnivorous animal of the weasel family, and genus *mustela* (Linn.), of which the generic characters have been given under **FISHER**; it is the *M. zibellina* (Linn.). In size it is about equal to the pine marten (see **MARTEN**), and its color in summer is brownish, with white spots on the head and grayish neck; in winter it is much darker, though not so dark as to justify the use of its name as an epithet signifying deep blackness, and the adjective sable has probably a different origin. The feet are hairy to the toes, indicating its residence to be a snow-covered region; it inhabits the frozen mountains of European and Asiatic Russia, where its chase is attended by great hardships on account of the severity of the climate and the barren nature of the country. The dark winter fur is highly esteemed, and forms an important article of commerce to the Russians; considerable numbers are carried to Russia and western Europe, where they bring almost fabulous prices, a single skin being worth from \$20 to \$60, according to its fineness and color; the hairs are so soft that they will lie any way in which they are placed. It lives principally in trees, lying concealed during the day and hunting by night; it will destroy a hare, though larger than itself, and also kills ermines and other small weasels; it may be tamed by kindness, and is very docile if taken young. It is by some regarded as a variety of the pine marten (*M. martes*, Linn.); but, though not an

uncommon animal, enough specimens do not exist in any museum to determine the question. The female has from 3 to 5 young, late in March or early in April. To the hardy sable hunters we owe the discovery of eastern Siberia. There is no evidence that this sable is found in America.

**SABLE ISLAND** (Fr. *sable*, sand), a low sandy island of the Atlantic ocean, belonging to Great Britain, 390 m. S. E. from Cape Canso, Nova Scotia, of which it is a dependency; length about 25 m., breadth varying from 1 to 5 m. It consists of two nearly parallel ridges of sand joined together at the ends, which enclose a lake or pond about 11 m. long and in some places 12 feet deep. There are two kinds of grass, wild peas, strawberries, cranberries, &c. The island supports about 500 wild horses, and some horned cattle. So many fatal shipwrecks have occurred upon Sable island and the sand banks and shoals which surround it, that an establishment has been formed for the relief of persons thrown upon its shores, the expense of which is borne jointly by the colony of Nova Scotia and the government of Great Britain.

**SAC**, a N. W. co. of Iowa, watered by the sources of the Raccoon and Boyer rivers; area, about 525 sq. m.; pop. in 1860, 246. It is not yet organized.

**SACAPA**, or **ZACAPA**, a town of Guatemala, pop. 10,000, situated about midway between the capital and the Atlantic port of Isabel, in the centre of a great plain, on the right bank of the Rio Copan.

**SACCATOO**. See **SACKATOO**.

**SACCHETTI**, **FRANCO**, an Italian novelist, born in Florence about 1335, died about 1410. In 1383 he was one of the council of eight at Florence, and subsequently *podestà* or chief magistrate successively at Bibbiena, San Miniato, and Faenza. His sonnets, *canzoni*, and other metrical compositions, obtained considerable repute among his contemporaries; but it is chiefly by his novels that he is now known. Of these, 255 are still in existence. They are in style and merit considered second only to the works of Boccaccio, though many of them are little more than elaborated anecdotes.

**SACCHI**, **ANDREA**, an Italian artist, born in Rome about 1599, died June 21, 1661. He gained considerable reputation in Rome at the accession of Urban VIII. by some large altarpieces executed for St. Peter's; and his fresco representing "Divine Wisdom," in the Barberini palace, raised him to the highest place among contemporary artists. His masterpiece is "St. Romualdo relating his Vision to five Monks of his Order," now in the Vatican. He had many scholars, including Carlo Maratta and Nicolas Poussin, and is considered the last great painter of the Roman school.

**SACCHINI**, **ANTONIO MARIA GASPARO**, an Italian composer, born at Pozzuoli, July 23, 1734, died in Paris, Oct. 7, 1786. He was educated at the *conservatorio di Santa Maria*, un-

der Durante. After producing numerous works in Italy and Germany, he arrived in 1772 in England, where he remained until 1784, when he established himself in Paris. His operas, once famous over Europe, are now scarcely known by name even, notwithstanding they are skilfully and richly harmonized and abound in beautiful melodies. The most celebrated in their day were *Il Cid*, *Tamerlano*, *Montezuma*, *Rinaldo*, and *L'Amore soldato*, composed for the London opera house, and *La colonie*, *L'Olympiade*, *Œdipe à Colonne*, and *Ecelina*, produced in Paris.

**SACHEVERELL**, **HENRY**, D.D., an English clergyman, born about 1672, died June 5, 1724. At Oxford he was a room mate of Addison, who in 1694 dedicated to him his "Account of the Greatest English Poets." He obtained a fellowship, received holy orders, and in 1705 was appointed preacher of St. Saviour's, Southwark. In 1709 he preached the two political sermons that gave rise to the trial which has rendered his name famous, the one at the Derby assizes on Aug. 15, the other before the lord mayor at St. Paul's on Nov. 5. In these he enunciated the most extreme high church and tory principles, maintaining the doctrine of passive obedience, thus by implication condemning the revolution of 1689 and all its consequences, and particularly denouncing the act of toleration. The sermons were printed and circulated in great numbers, and in December the attention of parliament was formally called to their dangerous tendency. The whigs being then in power under the ministry of Godolphin, Dr. Sacheverell was ordered to be impeached; and after long preliminaries the trial commenced before the house of lords, Feb. 27, 1710. On March 23 he was found guilty, but was only sentenced to 3 years' suspension from preaching, and the two sermons were ordered to be burned by the common hangman. During the whole affair the public passions had been highly excited, the populace generally siding with the accused. This tame conclusion was celebrated as a triumph with bonfires throughout the kingdom, and during a long journey soon after Dr. Sacheverell was everywhere met with ovations. These scenes were repeated on the expiration of his sentence in March, 1713; on the Sunday following which he preached a sermon at St. Saviour's from the text: "Father, forgive them, for they know not what they do," in which, says Lord Mahon, "he drew an unseemly parallel between his own sufferings and the Saviour's passion." The tories were then in the ascendancy under Harley, and the house of commons appointed Dr. Sacheverell to preach before them on the restoration day, and the queen presented him to the rich living of St. Andrew's, Holborn. Nevertheless, Bishop Burnet only confirms the general testimony when he says: "He possessed little of religion, virtue, learning, or good sense;" and he was afterward seldom heard of except through his quarrels and lawsuits with his parishioners. He



was strongly implicated in the intrigues of Bishop Atterbury for the restoration of the Stuarts.

SACHS, HANS, a German poet, born in Nuremberg, Nov. 5, 1494, died Jan. 25, 1578. He was by trade a cobbler, and was instructed in singing and verse making by Leonard Nunnenbeck, a mastersinger of Nuremberg. He passed the greater part of his life in his native city, and produced, it is said, the enormous number of 6,000 poems of all kinds, about one fourth of which only are in print. These include 53 sacred and 78 profane plays, 64 farces, and 59 fables. He was most conspicuous as a dramatic writer, and many of his pieces of this class are brief comedies called *Schwanken*, full of coarse, strong satire on the times. In point of literary merit they are on an equality with the early productions of the French and English stage. According to Heinsius, his most brilliant and copious period was between 1530 and 1538, although he continued to compose until near the close of his life. The eulogies of Goethe and Wieland at one time brought his productions into considerable prominence, and some critics have fancied that Goethe imitated Sachs in his *Faust*. Since the appearance in 1570-'79 of the collective edition of his works in 5 vols. fol., and the reprint in 1612-'17 in 5 quartos, several editions of selections from his works have been published in his native country. He was the most celebrated of all the mastersingers, and the most eminent poetical genius produced by Germany during the time of the reformation, which he aided by his pen. His personal character was so blameless that he was called "honest Hans Sachs."

SACK, a word in common use throughout England during the 15th century, as a general designation for the various kinds of dry wines then drunk. They were mostly Spanish wines, as sherris sack, that is, sack from Xeres in Spain. Howell, in "Londinopolis," writes: "Many kinds of sacks are known and used." At a later period the word seems to have been used as a general name for several varieties of sweet wine. The etymology of the term has been disputed, though it has been generally derived from the Spanish *secco*, through the French *sec*, dry. In an old account book of the city of Worcester the word is written *seck*. From the known fact that wine was kept on the continent in leathern bottles, it has been conjectured that these were called sacks in England, and gave the name to the wine.

SACK, FRIEDRICH SAMUEL GOTTFRIED, a German theologian, born in Magdeburg in 1738, died in Berlin, Oct. 2, 1817. He was educated at the university of Frankfort-on-the-Oder, in 1777 was appointed court chaplain in Berlin and preacher in the cathedral, in 1786 tutor to the royal family, and in 1816 Evangelical bishop. He was a voluminous writer, and published in 1812 a work entitled *Ueber die Vereinigung der beiden protestantischen Kirchenparteien in der preussischen Monarchie*,

which greatly promoted the subsequent union of the Lutheran and Reformed churches in Prussia. He assisted Schleiermacher in translating Dr. Hugh Blair's sermons into German. —KARL HEINRICH, son of the preceding, born in Berlin, Oct. 17, 1790, studied theology at Berlin under Schleiermacher, and in 1818-'15 officiated as volunteer and chaplain in the war against Napoleon. Since 1818 he has been professor of theology at Bonn. He has published various theological works.

SACKATOO, an empire in Soodan, or northern central Africa, lying between the Joliba and Benoowe rivers, and bounded N. by Asben and Gando, and E. by Bornoo, supposed to extend from about lat. 7° 30' to 13° N., and from long. 5° to 15° E.; pop. about 700,000, of whom nearly  $\frac{1}{4}$  are slaves. It comprises nearly the same territory as the ancient kingdom of Houssa, and forms a portion of that extensive region conquered by the Foolaahs about 1800. Its subdivisions are the populous districts of Kano, Zegzeg, Adamacoo, and Bauchi, and the more thinly settled provinces of Hamarruwa, Sambo Degimsa, Katatum, Sambo-Le, Katsena, part of Kebbi and Zaufara, Mesaw, Marmar, Shera, Kobern, Daura, and Kazaure. The principal cities are Wurno, the capital of the empire and residence of the sultan, Sackatoo, Kano, Yakoba, Yauri, and Rabba. The largest rivers are the Joliba and Benoowe; in the eastern part, some streams flow into Lake Tchad. The surface of the country is very uneven. The higher portions are dry and generally barren, but the valleys are extremely fertile. The climate of the northern portion is salubrious, except in the valleys during the rainy season. The productions are iron of very good quality, cotton, rice, tobacco, two species of yams, sorghum, tamarinds, plantains, &c. Sheep, cattle, horses, and camels are raised. The highlands are among the best in central Africa for grazing. The inhabitants are a tribe of the Foolaahs and the Goberawa, a native pagan negro tribe, the ancient owners of the country. They manufacture a considerable amount of superior iron. (See FOOLAHS.)

SACKBUT, a wind instrument of the trumpet species, capable of being drawn out to different lengths, and probably identical with the modern trombone, which is said to have been modelled by the Italians from an ancient one excavated at Pompeii. The instrument is mentioned in the Scriptures, but commentators differ as to its character and shape.

SACKETT'S HARBOR (or more correctly SACKET's), a post village and port of entry of Jefferson co., N. Y., about 8 m. E. of Lake Ontario, on the S. shore of Black river bay, in Hounsfield township, 170 m. W. N. W. from Albany; pop. in 1855, 994. The harbor, one of the best on the lake, is divided by a crescent-shaped tongue of land, which extends from the lower part of the village, into the outer and inner harbor. The latter has a sufficient depth of water for large vessels to with-

in 2 fathoms of the shore. Its commerce has been mostly diverted to other channels, the declared value of exports and imports having fallen from \$2,735,091 in 1846 to \$13,016 in 1859. The enrolled and licensed tonnage of the district in 1852 was 7,083 tons, and in 1859 1,375. The arrivals at the port in 1859 were 123 vessels of 85,489 tons. The village has a bank, several machine shops and mills, and the Madison barracks, built by the government in 1816-19, at a cost of \$85,000.—In the war of 1812 Sackett's Harbor was the most important point on Lake Ontario. It was the headquarters of the northern division of the American fleet, and several expeditions were fitted out there. It was twice attacked by the British, who were repulsed, the last time with a loss of 150 men. Several war vessels were built there by Henry Eckford; among them the *Superior*, a frigate of 66 guns, launched in 80 days from the time the timber was standing in the forest, and the ship *Madison*, built in 45 days. The hull of a war ship of 3,200 tons still lies on the stocks, its completion having been arrested by the close of the war; and another, of similar dimensions, has been taken down within a few years.

**SACKVILLE.** I. THOMAS, earl of Dorset, an English statesman and poet, born in Buckhurst, Sussex, in 1536, died in London, April 19, 1608. He was educated at the universities of Oxford and Cambridge, was called to the bar of the Inner Temple, and entered public life as a member of the house of commons. He was knighted by Queen Elizabeth, and in 1567 was created Baron Buckhurst; in 1570 he was sent as ambassador to France, succeeded Burleigh in 1598 as lord treasurer, and was continued in that office until his death. In March, 1603, he was created earl of Dorset. Shortly after leaving the university he planned the "Mirrour for Magistrates," a collection of stories by different authors recounting the misfortunes of persons eminent in English history. For the second edition of this, published in 1563, he furnished a poetical "Induction" or prologue, and the story entitled "The Complaint of the Duke of Buckingham." He produced the earliest known tragedy in the English language, "Gorboduc" or "Ferrex and Porrex," which was performed before Queen Elizabeth at Whitehall by the members of the Inner Temple, Jan. 18, 1562. His works were edited by the Rev. Sackville West in J. R. Smith's "Library of Old Authors" (London, 1859). II. CHARLES, a poet and literary patron, 6th earl of Dorset, 4th in descent from the preceding, born Jan. 24, 1638, died in Bath, Jan. 19, 1706. In his youth he was noted as a wit, and after the restoration became a favorite with Charles II., who occasionally employed him in foreign missions, and William III. appointed him lord chamberlain. Among his friends and panegyrists were Dryden, Prior, and Waller. His best composition was the song written before a naval engagement with the Dutch admiral Opdam, and

commencing "To all you ladies now at land." III. GEORGE, a soldier and statesman, 1st Viscount Sackville, son of the 1st duke of Dorset, and grandson of the preceding, born Jan. 26, 1716, died Aug. 26, 1785. He entered the military service as Lord George Sackville, was present at the battles of Dettingen and Fontenoy, served under the duke of Cumberland against the young pretender, and gradually rose to the rank of lieutenant-general. At the battle of Minden (Aug. 1, 1759) he commanded the allied cavalry, and for his failure to execute the commander-in-chief's order to charge the retiring French infantry, and render the victory of the allies decisive, he was censured in the general orders, and in April, 1760, declared by a court martial sitting in London unfit to remain in the service. George II. confirmed this sentence, and also struck his name from the list of privy councillors; but on the accession of George III. he was again taken into favor. In 1775, under the name of Lord George Germain (which he had assumed in 1770 in compliance with the conditions of a will), he entered the cabinet of Lord North as secretary of state for the colonies, which office he retained during the American revolutionary war, incurring great unpopularity by his opposition to efforts for the termination of hostilities; and during the Gordon riots of 1780 he was obliged to barricade his house against the mob. The king created him, in Feb. 1782, Viscount Sackville.

**SACO**, one of the largest rivers of New England, rising in the White mountains, Coos co., N. H., and formed by the junction of 3 principal branches at Bartlett, Carroll co. It flows in a S. E. course, until it enters Maine, then making an abrupt turn to the N., again pursues a S. E. direction through that state to the ocean at Saco. The main branch passes through the noted Notch of the White mountains. It has a number of falls which afford valuable water power. The principal of them are the Great falls, at Hiram, 72 feet; Steep falls, at Limington, 20 feet; Salmon falls, at Hollis and Buxton, 80 feet; and Saco falls, 42 feet. This last is about 4 m. from the mouth of the river, and is at the head of tide water and of all navigation by large vessels. The river is subject to freshets, having an ordinary rise in the spring of from 6 to 15 feet, but it has frequently very far exceeded that height. In 1785, 1814, and 1843 great freshets occurred, destroying many mills, bridges, and houses. The entire length of the river is estimated at 160 miles.

**SACO**, a half shire town of York co., Me., on the E. bank of the Saco river, about 4 m. from its mouth, and on the Portland, Saco, and Portsmouth railroad, 14 m. S. W. from Portland; pop. in 1860, 6,222. It is connected with Biddeford, an active and thriving city on the opposite side of the river, by 4 bridges. Its principal business is manufacturing. The York corporation (capital \$1,200,000) has in operation 5 mills for the manufacture of colored

cotton goods, running 35,000 spindles and 800 looms, employing 200 males and 800 females, and turning out 7,000,000 yards annually. There are 4 saw mills, but the lumber business is not extensive. It contains 2 banks, a savings institution with deposits amounting to \$150,000, a town hall costing \$25,000, a county gaol, an Athenæum, 23 public schools, and 8 churches, viz.: 1 Baptist, 1 Congregational, 1 Episcopal, 3 Freewill Baptist, 1 Methodist, and 1 Unitarian. It is a port of entry, and has a little foreign commerce; and ship building is carried on to some extent. The sea beach within the town (the part of which called Old Orchard beach is  $3\frac{1}{2}$  m. from the railroad depot) has unsurpassed facilities for driving and bathing, and has several hotels.

**SACRAMENT** (Lat. *sacramentum*, a military oath), a technical term of the Christian church, first used in the Latin translation of the Bible to render the Greek word *μυστηριον* (mystery). The fathers and writers of the ancient church used the word accordingly to denote any mysterious doctrine or thing. Subsequently it became customary in the Roman Catholic church to restrict its use to the designation of certain particular rites, which in the belief of the church were ordained to impart to the Christian who properly uses them an invisible grace. Catholics believe that there are 7 such sacraments, viz.: baptism, confirmation, the eucharist, penance, extreme unction, orders, and marriage, all of them, according to the declaration of the council of Trent, instituted by Christ himself. The Greek, the Armenian, and all the other eastern churches agree with the Roman Catholic church in the number and doctrine of the sacraments. In the church of England a number of distinguished theologians, especially in modern times (the authors of the "Tracts for the Times"), have inclined to the assumption that the Christian church has 2 primary and 5 secondary sacraments. The Protestants generally believe in but two sacraments, baptism and the Lord's supper, on the ground that the New Testament mentions only these two as having been instituted by Christ himself. Luther and Melancthon were, however, for some time inclined to count also penance among the sacraments, and in modern times the sacramental character of orders has found advocates among the so called High Lutherans. The Lutherans and the Reformed churches disagreed on the substance of a sacrament, and a violent controversy on this subject was carried on among the reformers of the 16th century. The Friends regard the rites of baptism and the Lord's supper as Jewish customs, which were not to be obligatory in subsequent ages. Some sects, as the Dunkers, Mennonites, Winnebrennerians, &c., coordinate the "washing of feet" with baptism and the Lord's supper, as an ordinance equally obligatory and equally efficacious.

**SACRAMENTO**, one of the largest and most important rivers of California, draining with the San Joaquin the great central valley

of the state. It rises in the N. E. corner of the state in the Sierra Nevada mountains, and in the earlier part of its course is called the Pitt river, and then the Upper Sacramento, the course of both being S. W. A small branch which rises in Mount Shasta in the N. central part of the state, called McCloud's fork, joins the main stream about 15 m. N. E. from Shasta City. Some consider this fork the true head of the Sacramento, and call the whole stream from the N. E. to this point Pitt river. From Shasta City the course is generally S. with a slight inclination to the E. until it reaches Sacramento City, whence it flows S. W. to its junction with the San Joaquin, and thence directly W. about 25 m. into Suisun bay, which is connected with the bay of San Francisco by San Pablo bay. It is navigable at all seasons to Sacramento, about 50 m., and ordinarily for small steamboats 150 m. further. Its length, estimated from the head of McCloud's fork, is about 350 m., or from the sources of Pitt river about 500 m. It has a great number of tributaries, the largest of which are the Feather and American rivers, from the Sierra Nevada, each with several large branches.

**SACRAMENTO**, a middle co. of California, bordered W. by the Sacramento river, S. by the San Joaquin and Mokelumne, and intersected in the N. W. by the American river; pop. in 1860, 24,145. It has a diversified surface, nearly level in the W. and hilly toward the E., and the soil is generally fertile. The E. portion contains deposits of gold, and an annual yield is derived from them of \$2,000,000. The productions in 1858 were 171,340 bushels of wheat, 516,782 of barley, 41,420 of oats, 191,300 of potatoes, 33,370 lbs. of wool, and 281,600 of butter. There were 8 grist mills, all but one propelled by steam, 2 steam saw mills, and 8 founderies. Capital, Sacramento.

**SACRAMENTO**, a city and port of entry and the capital of California, situated in an extensive plain on the E. bank of the Sacramento river, 125 m. by the course of navigation from the sea, and immediately S. of the mouth of the American river, in lat. 38° 33' N., long. 121° 20' W.; pop. in 1860, 13,788. The site is flat, 30 feet above the level of the sea and 20 feet above low water mark of the Sacramento river. The greater part of the plain near the city is bare, with occasional patches of open oak timber and bodies of swamp land near the rivers. The streets are wide and straight, and cross each other at right angles. Those running E. and W. are named by the letters of the alphabet; those crossing them N. and S. are numbered. The shops and stores are mostly of brick; the dwellings are of wood and are surrounded by gardens. Shade trees are abundant. The streets are covered with gravel or planked; cobblestone paving is rare. The city is supplied with gas, and water is pumped up from the Sacramento river, and distributed through the streets in pipes. The only important public building is the capitol, which is not yet com-

pleted.—The town is mainly supported by the trade of the Sacramento valley, which obtains all its supplies and exports all its produce through Sacramento city. Steamers run every day to San Francisco and Marysville, and twice a week up the Sacramento river to Red Bluff. During 1860 there were 571 arrivals of schooners and 301 of sloops at Sacramento. There are 25 steamboats owned in the town. The Sacramento in the dry season and at low tide has less than 3 feet of water at one place about 20 miles below Sacramento City, so that only boats of light draught can be used. A railroad 20 m. long runs to Folsom, and is being extended to Marysville. There are lines of telegraph connecting Sacramento with Los Angeles, Yreka, Carson City, San Francisco, and many other points of the state. The California stage company, which has its chief place of business in Sacramento, has a capital of \$1,000,000. Stages start every morning for Portland in Oregon, Marysville, Nevada, Downieville, Stockton, Jackson, Mokelumne Hill, and other leading towns in the central mining districts. All the supplies for Washoe, and most of those for the Esmeralda mining districts, also go through Sacramento.—The first white settlement on the site of Sacramento city was made in 1839 by J. A. Sutter, a Swiss by birth, but a naturalized American citizen, who obtained a grant of 11 square leagues of land, in 1841 built a fort which he called New Helvetia, took the neighboring Indians into his service, collected a few white men, and, by virtue of his remote position and the number of his adherents, secured influence and importance in the territory. This fort was the first point in California reached by immigrants crossing the continent. In 1848 nearly all persons going to the mines went up the Sacramento river in boats to New Helvetia, and thence proceeded by land. With the increase of the mining population and the gold yield the trade and importance of New Helvetia kept pace, and in Oct. 1848 there was an auction sale of lots in the town of "Sacramento," which was first named in the advertisement of the sale. In Jan. 1849, the first frame house on the bank of the Sacramento was commenced, and several months later the settlement moved from Sutter's fort down to the bank of the Sacramento, where it now is. The site of the city was originally only about 15 feet above low water mark, and as the river frequently rises 20 feet, it was subjected to overflow. In Jan. 1850, in March, 1852, and in Jan. 1853, the city was flooded so that boats were used in going from house to house, some of the streets having 5 feet of water in them, and not more than a dozen houses being on land above the water level. To prevent similar disasters the streets were filled in 5 feet deep with earth, and the city surrounded by a levee, which last alone saved the place from overflow during the flood in the spring of 1861. On Nov. 3, 1852, a conflagration destroyed 600 houses and other property, in all estimated to

be worth \$5,000,000. In July, 1854, the city was visited by another large conflagration, the loss by which was estimated at \$650,000. The capital was established at Sacramento by an act of the legislature on Feb. 25, 1854; and in 1861 the work was commenced on a capitol, the officers having previously occupied rented buildings. On Feb. 3, 1856, the railroad to Folsom was opened.

**SACOS AND FOXES**, associated tribes of Indians, formerly occupying the country between the Illinois and Mississippi rivers, and now established in the Indian territory. These tribes were united in 1805. The Foxes were dispossessed by the Black Hawk war. The Jesuits visited them as early as 1668.

**SACY**, ANTOINE ISAAO SYLVESTRE DE, baron, a French orientalist and author, born in Paris, Sept. 21, 1758, died Feb. 21, 1838. As a child he studied Greek and Latin, and when 12 years of age he conceived a taste for the oriental languages, studied Hebrew, Syriac, Chaldaic, Samaritan, Arabic, and Ethiopian, and subsequently Italian, Spanish, English, and German, and finally Persian and Turkish. In 1783 he first attracted the attention of the learned by addressing to the scholars of Germany translations from the Hebrew, accompanied by notes containing interesting results from his own researches. In 1785 he wrote a work upon the ancient history of the Arabs and the origin of their literature, which however was not published till more than 20 years afterward; and in the same year he was commissioned by the academy of inscriptions to make an extended analysis of the Persian and Arabic works in the royal library. He published about this time two treatises on the antiquities of Persia and on the Arabic version of the books of Moses, and was in 1791 admitted to the academy of inscriptions and belles-lettres, as an honorary member. During the revolution he lived in the midst of his books, forgetting the world and forgotten by it. It was at this time that he commenced his great work on the religious system of the Druses. In 1806 he was appointed professor of Persian and Turkish in the college of France, and upon the reconstitution of the academy was readmitted to his former place. He was also sent by the government on a literary mission to Genoa, and for the first and last time he left Paris. He hailed with enthusiasm the return of the Bourbons in 1814. In Feb. 1815, the king appointed him rector of the university of Paris. In 1822 he conceived with Abel Rémusat the plan of bringing together the lovers of oriental literature, and hence arose the Asiatic society, of which he was the first president. He continued till his death constantly active, both as a scholar and a political writer, and published almost alternately learned treatises on nearly every branch of oriental literature, and brilliant popular pamphlets on political movements. He lost in 1835 the wife who had been his companion for 50 years, and never fully recovered from the shock.

**SADDLE**, a seat placed upon the back of a horse for the rider. It may either be of padded leather hanging down each side and girthed to the body of the horse, or, as is more common, it may be made with a stout and light frame of wood called the saddle tree, secured at the joints with iron, and stuffed with hair. The lower part that rests against the horse is covered with stout linen or woollen cloth, and is called the saddle pad; and the upper part, which forms the seat, is of thin leather, principally of hogskin, plain or quilted. Broad flaps of heavy leather, called skirt leather, hang down the sides, covering the girths, and intervene between the legs of the rider and the sides of the horse. In common riding saddles the top of the seat is comparatively flat, somewhat raised behind, but very little so in the front end or pommel, which is gently rounded rather than pointed over the ridge. The saddles of the old cavaliers were remarkable for their high peaks before and behind, the seat being a deep hollow between them, and thus very secure. This form is still preferred by Spaniards and Mexicans, and commonly also for military saddles, to the pommel of which are attached the leather holsters for pistols. The McClellan saddle, used by the U. S. cavalry, is a modification of it. For use in very hilly countries saddles are furnished, beside girths to go under the belly of the horse, with a breast strap and a crupper, and breechings especially for ladies' saddles.—Saddles are not of very ancient invention. In the time of Alexander Severus, as stated by Lampridius, the horses of the whole Roman cavalry had beautiful coverings, and these appear to have been employed generally by the natives of the East. Xenophon reproaches the Persians because they placed more clothes on the backs of their horses than on their beds. These coverings appear to have been gradually transformed into saddles, the invention of which Beckmann thinks may be referred to the middle of the 4th century. The emperor Theodosius in 385 by an order restricted the weight of those used for post horses to 60 lbs. Stirrups for supporting the feet, hung at the sides of the saddle, were invented long after the saddle itself, as is supposed some time in the 6th century. Roman youths were taught to vault on horseback, and mounting blocks or stones were generally provided along the roads for the convenience of ladies and other persons, and portable stools were also used. People of rank were assisted by servants, and captives were sometimes ignominiously made to stoop that their conquerors might step upon their backs. Horses too were trained to kneel, and spears or lances were furnished with a step or projection or a loop of leather for the foot. The saddles, bridles, and trappings used by the English in the 13th century are represented by Strutt as differing little from those of the present time, except in the depth of the seat of the saddle. "The Saxon and Norman women of

that period, whenever they are represented on horseback, are seated sideways, agreeable to the present custom." Side saddles for women are furnished with two pommels in front, one on the left side over which the right leg is supported, and the other on the right to keep it from slipping over the saddle. For these only one stirrup is required.

**SADDUCEES**, the name of a Jewish sect. According to a Jewish tradition, the name is derived from Tzadok, the reputed founder of the sect, who flourished in the early part of the 3d century B. C.; but Epiphanius derives it from the Hebrew word *tzaddik* (just), and says that the followers of the sect assumed this name as they considered themselves preëminently as the just. Both these derivations are uncertain and doubtful. They appear in history for the first time under the Maccabæan Jonathan, about 144 B. C. They acknowledged only the written law, and rejected the obligatory character of all traditions; they denied the existence of spirits and angels in general, and held that the soul dies with the body, and has to expect neither reward nor punishment after death; they also denied a special providence, and made all human actions solely dependent on the free will of men. The sect was never numerous, especially in comparison with the Pharisees, but highly influential, as it mostly recruited itself from the educated and wealthy classes. Toward the close of the distinct national existence of the Jews the Sadducees were formally excluded from Judaism, and gradually disappeared; but some of their principles were revived by the sect of Caraites. A valuable work on the Sadducees has been written by Grossmann, *De Philosophia Sadducæorum* (Leipsic, 1836).

**SADI.** See **SAADI**.

**SADLER**, SIR RALPH, an English statesman, born in Hackney, Middlesex, in 1507, died at Standon, Hertfordshire, March 30, 1587. In his 11th year he attracted the notice of King Henry VIII., by whom he was afterward employed in the dissolution of the religious houses, and shared largely in the rich spoils of that measure. From 1537 to 1542 he made several journeys to Scotland upon diplomatic missions, making unsuccessful efforts to break the close alliance between Scotland and France, and to bring about a marriage between the princess Mary and the prince of Wales. The king named him in his will one of 12 councillors to the 16 nobles to whom the care of the kingdom was intrusted. Upon the accession of Mary he retired to his estate near Hackney. When Elizabeth came to the throne he was called into the privy council, and upon the imprisonment of Mary queen of Scots in the castle of Tutbury, he was appointed her keeper. After the execution of Mary he was sent to Scotland to pacify King James. The transactions of his various missions and other public employments are recounted in his "State Papers and Letters" (Edinburgh, 1809).

SAFE, a strong box or closet for the preservation of money, valuable papers, &c., usually made of iron, and as nearly proof against fire and burglars as possible. Until the present century the most usual safes were boxes of oak or other hard wood, more or less strengthened by iron bands and provided with several locks. About the year 1820 they were imported from France still more strongly made, the wooden box being covered on the outside with iron plates, over which bands of wrought iron 2 inches wide were crossed at right angles, leaving between them square spaces. At the crossings large-headed nails passed through the bands, the plate, and wooden box, and were clinched on the inside. The box was finished with a sheet iron lining and furnished with a formidable lock with 6 or 8 bolts. Safes of this sort were first made fire-proof about this time in Paris by introducing a layer of plaster of Paris between the inner and outer surfaces. The idea seems to have been derived from the manner of constructing houses in France with the same object of protection against fire, a hollow space of 5 to 9 inches between the inner and outer walls being filled with a paste of the plaster, which soon set and became hard. The first American safes that attained any celebrity were those constructed under the patent of O. J. Gayler, issued in 1833. They were double chests with spaces between them for air, or other good non-conductors of heat. The great fire in New York of 1835 gave rise to several new inventions for increasing the fire-proof quality of safes. That patented by Mr. B. G. Wilder of New York obtained the precedence, and the safes made on this plan are still in extensive use in this country and in Europe. They consist of a double box of wrought iron plates strengthened at the edges with bar iron, and in the larger sizes with a bar across the centre. The space between the outer and inner plates is filled in with the patented composition of plaster of Paris and mica. The use of asbestos with plaster of Paris has also been patented. The latter answers a very good purpose used alone, and other good incombustible non-conductors also employed for filling are clay, hydraulic cement, and a mixture of alum, fire clay, and carbonate of lime or chalk. The latter is the preparation employed in the safes of Valentine and Butler, made in New York. A mixture was patented by Prof. A. K. Eaton, of New York, either of pure alumina, which he prepared by a cheap original method, and sulphate of alumina or alum, or of pure alumina and fire clay. He found that a perfectly dry filling, like alumina alone, was not so effective in withstanding intense heat as a mixture containing water, either combined as water of crystallization or introduced in mixing the material to a paste. The most favorite mixtures are of this character, notwithstanding the dampness thus induced often occasions mouldiness upon the books and papers, and oxidizes the iron. The reason for this preference is, that when the safe is exposed

to a high temperature, the water is gradually given up and converted into steam, rendering latent a large amount of heat; and so long as this continues the contents of the safe are protected. In testing the comparative value of different mixtures, the manufacturers observe that so long as steam appears no excessive heat can reach the articles covered by the preparations. In a burning building a safe would rarely be exposed to intense heat for a longer time than would be required for the moisture of the filling to escape in steam. After this has occurred there is little if any difference in the comparative values of the several non-combustibles used. They would in a continued high heat all soon become red-hot, and every thing combustible must then become charred. In the improved safes of Silas O. Herring of New York the danger of dampness from the filling is guarded against by an inner sheathing coated with asphaltum or other cement, so as to be impervious to moisture. These safes display excellent workmanship and finish, and are constructed of heavy iron specially prepared from the franklinite iron of New Jersey on account of its superior hardness. This is for security against the drills of burglars; and for the same object a steel plate back of the outer iron plate has been introduced in other safes. The locks are of the greatest strength and most ingenious construction. The strongest of all safes is that patented in 1851 by Lewis Lillie of Troy, N. Y., made of wrought and of chilled iron. The base is a network of wrought iron bars  $\frac{1}{2}$  inch thick by  $1\frac{1}{2}$  to 2 inches wide, forming a complete rectangular box, the front of which only is open. This box, being filled with moulding sand, is itself placed in a mould, so as to leave a space all around of  $1\frac{1}{2}$  to 2 inches, according to the size and character of the safe, and melted iron is run into this space and chilled. The whole box is thus made of one mass without joints, and presents a smooth external surface of hardened iron impenetrable by drills, and too solid to be broken up by sledges and bars. An inner plate iron lining is introduced, with a space between this and the outer portion for plaster of Paris. The doors are constructed like the rest of the safe, and secured by a powerful lock on the mental combination principle, and thoroughly powder proof. (See Lock.) The only objection to these locks is the chance of losing the combination. This mishap occurred at the manufacturer's bank at Troy in 1858, giving an opportunity of testing the burglar-proof qualities of the safe, which it then became necessary to break open, an operation that required the labor of several workmen for 10 hours.—Safes of the largest sizes, as now constructed, are spacious closets fitted with shelves and drawers, and compartments with strong locks. These safes are commonly built in brick work during the construction of the building for which they are designed. Vaults are closets in brick or stone work furnished with iron doors and internal fittings like safes.

**SAFETY LAMP.** See LAMP, vol. x. p. 280. **SAFFLOWER**, the dried florets of *carthamus tinctorius* (Linn.), an annual plant of the natural order *compositæ*, having an erect cylindrical stem a foot or two high, a little inclined to branch, and sessile, oval, sharp, and spiny leaves, with compact heads of flowers of a deep orange color. The safflower is principally used as a dye and in the making of rouge. (See *CARTHAMUS*.) An oil, in much repute among the ancients for its laxative property, is extracted from the seeds, and is still employed by the Asiatics for the same purpose, as well as for external application. As a lamp oil its use is extensive. The seeds are a favorite food for birds of the parrot tribes, and have been employed medicinally in cases of dropsy. The plant is sometimes introduced into the flower border.

**SAFFRON**, the name of the prepared stigmas of the *crocus sativus*, which grows wild in Asia, but has become naturalized in some parts of England. It has a perennial, solid, flattened rhizoma, usually called a bulbous root, which is invested by a strong fibrous coat; its leaves are linear, slightly revolute, of a deep green color with a white line along the centre, several in number, and all enclosed in a membranous sheath; the flower appears in autumn before the leaves, and consists of a regular petaloid, infundibuliform, bell-shaped perigone of 6 divisions; the stamens, 6 in number, rise from the throat of the perigone, each having a threadlike filament and linear anther; the style is very long and filiform, bearing a 3-divided, nodding, scented, deep orange stigma. For saffron, the flowers are picked just as they are expanding early in the morning, and the stigmas carefully extracted; the latter are then dried in a peculiarly constructed kiln, and by accompanying pressure between a hairy cloth and several sheets of white paper the mass is converted into a cake, which when thoroughly desiccated is ready for the market. Sometimes the stigmas are dried without pressing, when the product is called hay saffron, and is considered the best. The high price of saffron depends, as is readily seen, on the smallness of the parts of the flower employed. Other substances are however mixed with it, such as the florets of the *carthamus* (see *SAFFLOWER*), of the *calendula officinalis*, and even dried fibres of beef; but these adulterations can be detected by maceration, the florets unrolling in water; and the flesh may be discovered by the peculiar animal odor which it gives out in burning.—The use of saffron for perfuming and for seasoning dishes among the ancients indicates the antiquity of its cultivation. In England, especially near Walden in Essex, extensive gardens existed exclusively devoted to saffron cultivation, and from this circumstance that neighborhood was called Saffron Walden. Other parts of England have paid attention to this crop. Saffron is now chiefly imported from France, Spain, and other countries of southern Europe, although the English saffron is reputed to be the best for

use in pharmacy. The soil most suitable is rather rich and mellow. The roots are planted in June, 8 inches apart, and in rows 6 inches distant from each other. A plantation generally lasts 3 years before needing renewal; and the average produce is 2 lbs. of saffron per acre for the first year, considerably more for the second, and as much as 24 lbs. for the third. The harvest is however liable to great loss from a parasitic fungus, which attacks the roots, termed *rhizoctonia* by De Candolle, which so rapidly spreads over whole fields that it exterminates entire crops. This destroyer is a variously shaped, aggregated, cartilaginous, fleshy, light reddish brown tuber about an inch long, emitting long, capillary roots or offsets, which, spreading in every direction, attach themselves to the saffron crocus and permeate its substance. Nothing but deep trenching around infected districts has proved effectual in staying its ravages. In the United States the saffron crocus is sometimes seen in gardens, being considered a beautiful autumnal border flower.—Saffron is employed both as a medicine and a dye. Its taste is of a warm, bitterish character, its odor sweet and penetrating, and its color a rich deep orange. Its action is stimulant and antispasmodic, and it is seldom exhibited in medicine except as a qualifying ingredient. The coloring matter, termed polychroite, in allusion to the diversity of tints it is capable of assuming, is soluble in water and alcohol, but varies by the action of different acids.

**SAG HARBOR**, a village and port of entry in Suffolk co., Long island, N. Y., on an arm of Gardiner's bay, and lying partly in Easthampton and partly in Southampton township; pop. in 1855, 2,776. It has a good harbor, and is largely engaged in the fisheries and coasting trade. It contains the Sag Harbor institute, a savings bank and a bank of circulation, 2 newspaper offices, a cotton flannel factory, the Suffolk mills, making over 10,000 yards per week, 2 clock factories, and 6 churches. The tonnage of the district in 1859 was 7,273, of which 6,075 was engaged in the whale fishery.

**SAGA.** See ICELAND, LANGUAGE AND LITERATURE OF.

**SAGADAHOCK**, a S. co. of Maine, formed from Lincoln co. in 1854, bordering on the Atlantic, and intersected by the Kennebec river; area, about 300 sq. m.; pop. in 1860, 21,790. Nearly one half the county is composed of small islands at the mouth of the Kennebec, and it has numerous bays and channels. The soil is fertile. The inhabitants are largely engaged in ship building, fishing, and the coasting trade. It is intersected by the Kennebec and Portland railroad. Capital, Bath.

**SAGAPENUM**, a gum resin, brought from Alexandria and Smyrna, and used in medicine. It is supposed to be a product of some umbelliferous plant, and Willdenow is inclined to regard this as a *ferula*. Its properties were known to the ancients, and it is spoken of by Hippocrates, Dioscorides, and Pliny. It is re-



ceived in agglutinated fragments of brownish and reddish yellow colors, of consistence like wax, of a garlicky odor, less disagreeable than that of asafetida, and of a hot, nauseous, bitterish taste. Analyzed by Brandes, it was found to consist of resin 50 per cent., gum with calcareous salts 32.5, volatile oil 3.5, bassorine 4.2, malate and phosphate of lime 1.1, water 4.5, impurities 4.2. It is a moderate stimulant, intermediate in its properties between asafetida and galbanum.

**SAGE** (*salvia officinalis*, Linn.), a low, shrubby, aromatic plant, of the natural order *lamiaceae*, extensively used for culinary purposes. It has a perennial root; a half-woody, irregular stem, branching on all sides; hoary, crenulate, and wrinkled leaves; deciduous bracts at the base of the flowers, which are borne in spikes, their calyces subcampanulate with spiny teeth, the corollas of a violet purple color, sometimes rosy or pale reddish white, and the seeds smooth and brown. The garden or official sage is chiefly employed in the kitchen. Medicinally exhibited, its infusion makes a good gargle, and a tea of its steeped leaves is often used in fevers. It is readily raised from seeds, cuttings, or division of the roots. When planted out, the plants should be at least 6 inches apart. A dry, warm, and moderately fertile soil is best suited to it. It is a native of the south of Europe, and has been long cultivated. There are many other species, some of which are highly ornamental and esteemed by florists, such as the splendid sage (*S. splendens*), from Mexico, with large spikes of scarlet flowers, equally well adapted to the greenhouse and the open border; the scarlet sage (*S. coccinea*), with smaller but handsome blossoms; the open-corolled sage (*S. patens*), with tall, open spikes of very large mazarine blue blossoms; the bracteated sage (*S. involucrata*), with thick, obtuse spikes of reddish purple flowers; the clary (*S. sclarea*), with large, beautiful, purplish green, deciduous bracts. The species are all labiate-flowered, and none of injurious properties; they range for the most part between lat. 40° and 50° N.

**SAGE, ANTOINE RENÉ LE.** See **LE SAGE.**

**SAGHALIEN, TABAKAI, or KRAFTO**, an island of Asia lately annexed to Russia, lying off the coast of Mantchooria, bounded N. and E. by the sea of Okhotsk, S. by the strait of La Pérouse, which divides it from the island of Yesso, and W. by the sea of Tartary, which separates it from the continent; extreme length about 600 m., breadth 120 m.; area, 30,000 sq. m. The coasts are much indented, but there are very few good harbors. A chain of mountains extends from the S. extremity of the island to about the centre, few of the summits exceeding 5,000 feet in height, though they are covered with snow for the greater part of the year. The centre of the island is low and swampy, but becomes elevated toward the N. The climate is cold, and fogs are very prevalent. Whales frequent the strait of La Pérouse and the sea

of Okhotsk. The inhabitants are few in number, and scarcely any signs of them are found on the E. side. They subsist chiefly on fish. (See **ARNU.**) Some Japanese have settled on the S. end of Saghalien, and Chinese or Mantchoos at the N.

**SAGINAW**, a river of Michigan, which is formed by the confluence of the Flint and Shiawassee, and flowing nearly N. falls into Saginaw bay. Its branches and tributaries, flowing from all points, drain nearly the whole of the lower peninsula. The main stream is about 30 m. long, and is navigable for the largest steamers to Saginaw City, 24 m.

**SAGINAW**, an E. co. of Michigan, bounded N. E. by the bay of the same name, and drained by the Saginaw river and its affluents, the Flint, Shiawassee, Tittibawassee, Cass, and Sheboygan; area, 1,030 sq. m.; pop. in 1850, 2,609; in 1860, 12,693. The surface is level or gently undulating, and the soil very fertile. The principal exports are fish and pine lumber. It has abundant water power, and numerous saw mills. Capital, Saginaw City.

**SAGINAW BAY**, an arm of Lake Huron, and the largest of the numerous bays indenting the coast of the Michigan peninsula. It is situated in the E. part of the state, 60 m. long by 30 broad at the widest part, and has several good harbors.

**SAGO** (in Malay, Javanese, and all the other languages of the Indian archipelago, *sagu*), a farinaceous substance prepared from the pith of different species of palms and cycas growing on the coasts and islands of the Indian ocean. The palms that produce the largest quantities of sago are the *sagus levis* and *S. gemina*. Of the latter, the Malay sago palm, Roxburgh speaks as the tree "the pith of which is the staff of life to the inhabitants of the Moluccas." The other furnishes most of the sago of commerce, which is exported chiefly from Singapore. It is prepared in the state of raw sago meal, sago flour, and granulated sago. The first is procured in the Moluccas as follows. Just before the appearance of the flower bud, when the farina or starch is most abundant, and a whitish dust is seen covering the leaves, the tree is felled and cut into lengths of 6 or 7 feet. One side of each of these pieces is split off down to the pith, and this is taken out except a portion at each end. Into the trough thus formed the pith is returned, mixed with water, and beaten with a piece of wood. The woody fibres float and are separated, and the meal subsides. Being several times washed with water, the meal may be moulded into cakes and dried to be sold for the use of the natives; or it is put in baskets made of the palm leaves, and if to be kept some time, these are sunk under fresh water, in which, protected from the air, it is prevented from souring. It is stated that 500 or 600 lbs. of the meal are sometimes obtained from a single tree. The sago flour is prepared by repeated sifting and washing, and it is commonly bleached with

chloride of lime. The granulated sago is formed by rubbing a paste of the meal through sieves, from which the grains are usually received upon a heated iron surface. The best prepared forms grains as large as pin heads, whitish tinged with light brown, and sometimes translucent. This is known as pearl sago, and the darker colored as brown or common sago. They are without odor, and have but little taste. In cold water common sago is not soluble, and pearl sago only partially so; but in boiling water they both dissolve and form a thick starch-like solution, which is a delicate article of food or diet for children and invalids. A factitious sago, prepared from potato starch, is largely sold in Germany and France. It can be detected and distinguished from the genuine sago by microscopic examination only.

SAGOSKIN. See ZAGOSKIN.

SAGRA, RAMON DE LA, a Spanish writer on political economy and physical science, born in Corunna in 1798. He was educated at Madrid, and in 1820 appointed director of the botanical garden at Havana, and professor of agricultural botany; he had also the charge of a farm school. In 1832 he made the tour of the United States, and in 1835 returned to Europe, visited most of the large cities, and finally settled in Paris, where he was elected corresponding member of the academy of moral and political sciences. In 1831 he had published *Historia economica, politica y estadística de la isla de Cuba* (4to., Havana), which he afterwards recast and enlarged under the title of *Historia física, política y natural de la isla de Cuba* (2 vols. fol. with plates, Paris, 1837-'42), the best general account of the island yet written. During his travels in Europe and America he visited most of the benevolent institutions of the two continents, and his observations on those of the United States, Holland, and Belgium are given in *Cinco meses en los Estados Unidos* (8vo., Paris, 1836) and *Voyage en Hollande et en Belgique* (2 vols. 8vo., 1839). Returning to Spain, he devoted himself from 1840 to 1848 to the discussion of practical questions of political economy, gave a course of lectures on social economy at the Athenæum in Madrid, and edited, with M. Rufino, a weekly review, "The Commercial Guide," and a monthly "Review of Material and Moral Interests." On the fall of Louis Philippe he went to Paris, and at once avowed himself a socialist, and within the next two years published (beside a great number of newspaper and review articles) 7 works on social reform, the organization of labor, banks for the people, &c. In 1850 he returned to Spain, which he represented on the international jury of the great exhibition at London in 1851, and published a work on the Spanish products sent to the exhibition, and some considerations on Spanish industry. In 1854 he was elected to the cortes, and took his place among the partisans of O'Donnell, advocating the royal prerogative; but on economical questions he join-

ed the extreme left, and advocated the law of amortization. The *coup d'état* of Gen. O'Donnell in 1856 led to his return to private life.

SAGUENAY, a large river of Canada East, usually regarded as formed by two outlets of the lake of St. John, though, if the affluents of the lake were regarded as forming a part of the river, as they should be, its sources would be found far up the Laurentian range, near Lake Abbitibbe. From the junction of the two outlets, 9 m. below the lake, the Saguenay flows in a S. E. course, with a stream from  $\frac{1}{2}$  to 2 m. in width, at first between gently sloping banks; but below Grand bay it forces its way through dark, frowning, perpendicular cliffs of granite and syenite, one of them, Cape Trinity, towering up 1,500 feet above the river, and another near it, called Pointe d'Éternité, still more lofty. The depth of the river is remarkable. At the point just named, 34 m. from its mouth, there is a recess or bay which, by actual measurement, is  $1\frac{1}{2}$  m. in depth; and at another point, a little lower down, called St. Jean's bay, the depth is  $1\frac{1}{2}$  m. Its average depth in mid-channel, according to Admiral Bayfield, is 145 fathoms. It is navigable for steamboats for 75 m. from its mouth in the St. Lawrence river; above that point the rapids prevent navigation, and at low water a bar about 60 m. from its mouth prevents large vessels from ascending. Its mouth at Tadousac is 130 m. below Quebec, and 280 above Anticosti island. Its scenery is hardly surpassed in grandeur in America.

SAGUENAY, a county of Canada East, lying along the N. shore of the St. Lawrence, and extending to its mouth; area, about 65,000 sq. m.; pop. about 2,000. This county was for some time after 1851 the county of Tadousac, the old county of Saguenay having, by act of parliament in 1858, received the name of Charlevoix. The judicial district of Saguenay includes the counties of Saguenay, Charlevoix, and Chicoutimi, and the chief town of the district is Murray Bay or St. Étienne. The county of Saguenay has very few settlements, being mostly forest. The small towns on the St. Lawrence are, however, among the oldest in British America. Tadousac, at the mouth of the Saguenay, a post of the Hudson's bay company, dates back to the 16th century, and its little Catholic church is said to be the oldest in America.

SAGUNTUM, or SAGUNTES, an ancient town of Spain, the ruins of which, consisting of a theatre and a temple of Bacchus, are still visible at Murviedro in the province of Valencia, near the mouth of the river Palancia (anc. *Palantias*) in the Mediterranean. It was founded, according to tradition, by a Greek colony from Zacynthus (Zante), who named it after their native island, was built on an eminence in the midst of a fertile region, and became early important as a commercial emporium, but owes its celebrity in history to its siege and destruction by Hannibal, which was the opening of

the 2d Punic war. It was rebuilt by the Romans and made a colony. The name of the modern town on its site is derived from *muri ceteres* (old walls).

SAHARA, the great desert of N. Africa. Commencing upon the shores of the Atlantic on the W. and approaching in its range across the continent the S. coast of the Mediterranean in Tripoli and Barca, it extends beyond the Nile to the E. limits of Africa, while from N. to S. it covers at least 15 degrees of latitude—from lat. 30° to 15° N. Its whole extent is estimated in round numbers at 3,000 m. in length and 1,000 in width. Under other names the desert region is traced E. through Arabia, Persia, and central Asia, even to the confines of China, maintaining throughout this vast extent of about 120° of longitude, and 6,000,000 or 7,000,000 sq. m., the same general features. Until the recent explorations of Barth, Overweg, Richardson, and Vogel, very erroneous impressions have prevailed as to the true character of the great African desert. The reports of those who have accompanied the caravans in their long journeys from Morocco or Tunis to Timbuctoo; from Tripoli to Air, or to Lake Tchad, both on the S. margin of the desert in central Africa; or from Barca and Cairo to the upper regions of the Nile, are all taken up rather with accounts of the dreariness and dangers attending the crossing of the sandy tracts, and the relief afforded by the occasional oases, than of the more familiar features of the hills, mountains, and valleys that occupy the larger portion of the area included in the desert. Low plains covered with drifting sands, their desolation often even increased by wide-spread coatings of salt, and varied by vast fields of naked rock, upon which the traveller might pass for days together without seeing a grain of sand, made up the general idea entertained of the desert of Sahara. But while all these are met with, the travellers named above describe the great Sahara as a region of elevated plateaus rising up into mountains of 3,000 to 5,000 feet in height, separated from each other by valleys and by immense sandy tracts. Ascending from the Mediterranean in Tripoli or Barca, the summit of the Gharian plateau is reached at the height of 2,000 feet, whence it gradually slopes away to 500 feet, and in some places even below the level of the sea. Beyond rises the long range of table land called the Hamadah, stretching E. and W., which for 120 m. toward the S. maintains an elevation of 1,300 to 1,600 feet. Toward the N. W., near Sokna, this stony table land passes into the so called Black mountains, or Jebel-es-Soudy, and in the other direction between Moorzook and Egypt it breaks into huge cliffs called El-Harouj. Toward the Mediterranean the whole range is remarkable for its gigantic walls of bare rock that bound the plateaus. Between the Hamadah plateau and the Moorzook plateau are dry channels, called wadys, at elevations of 600 to 700 feet, and small deserts of

1,000 feet above the level of the sea. The route then ascends about 500 feet higher, and over a sandy region varying in height from 1,000 to 2,200 feet continues to the mountainous country between Ghat and Air, where is a wady at a height of 2,956 feet, amid mountain peaks of about 4,000 feet elevation. Further S. the altitude of the region is supposed to be about 1,900 feet. Similar features are developed by the explorations of Vogel in the E. part; and his conclusions in the neighborhood of Bilma in 1853 were that the great desert is one vast plateau formation of the general height of from 1,200 to 1,500 feet. The natives of this portion report high mountainous tracts near the S. border of the desert; and two ranges in particular are spoken of, the Borghoo and the Madschunga, which are so elevated that the natives dress in furs. Tibesti is a high mountain N. E. of Bilma, celebrated among the Tibboos for the wildness of its rocky fastnesses, which to them are a secure place of refuge from the attacks of their enemies the Tuariks. These live among other mountainous districts further W., where on account of the elevation of the country the climate requires them to be clad in woollens and furs. The greatest expanse of sand and salt desert appears to be found between Tuat and Timbuctoo, and thence still further toward the Atlantic. Over these wastes are found marine shells of recent species, showing that at no very remote geological period the plains formed the bed of the ocean. Even within the historic period the surface of some portions has undergone no slight changes, the ruins of unknown cities being known to lie buried beneath the sands; and where were once fertile territories, nothing is now to be seen but the driving sand. Occasionally a real island of verdure, an oasis in the desert, is met with, where around cool springs of water the date palm flourishes with acacias and ferns, and the exuberance of the tropical animated nature is recognized in the various forms of lions, panthers, gazelles, reptiles, and birds. But for the camel, well termed in oriental language "the ship of the desert," these wastes would be impassable to man. At certain seasons it is now crossed on the routes named and some others by large caravans of traders. At times the dreaded S. wind called the simoom comes upon them with terrible fury. The burning sands roll on in vast clouds, darkening the air and overwhelming every object in the range of the storm. The camels and travellers throw themselves upon the ground and hide their heads until it has passed. The greatest calamity is exhaustion of the supplies of water and failure to find more. The bleached bones of many thousand animals and men who have perished from this cause now lie in the sands. In 1805 a caravan of 2,000 persons and 1,800 camels was thus destroyed.—The great desert owes its sterility chiefly to its geographical position in a tropical climate and under the lee, as regards the prevailing N. E. trades, of vast territories in Eu-

rope and Asia from which these winds collect little moisture. Even in their passage across the Mediterranean the quantity furnished to them must be very small by reason of its narrowness; and any excess is soon parted with as the winds strike the mountains on the S. coast of this sea. Reaching the heated plateaus beyond, the capacity of the air to retain moisture is greatly increased by its access of temperature, and any vapors or clouds disappear as the moisture present passes into the invisible state. To the S. of the desert is the rainy equatorial belt, which in Africa receives its supplies chiefly from the S. E. trades; and the great desert is beyond their influence to the N. except so far as they contribute to feed the Nile, the only river that traverses the barren region. In the mountainous portions of the desert, however, rains do occasionally fall, and even produce torrents of water that suddenly pour down with fury into the valleys, and almost as suddenly disappear. The character of the geological formations is also unfavorable for fertility. The vast bodies of silicious sand afford little or no nutriment to vegetable growth, and their unstable nature is entirely opposed to its development. Even in mineral productions the desert maintains its character as a barren waste. No useful products are obtained from it except the salt, which is largely collected by the caravans, and sold in the Soudan regions. As would seem from its position and surface, the hottest portions of the earth are to be found on this desert range. In the portions contained in Mesopotamia the thermometer has been seen to rise to 132° in the shade and to 156° in the sun; and for the month of July the mean temperature is estimated at 90½°. (See ISOTHERMALS.)

SAIDA (anc. *Sidon*), a town of Syria in the pashalic of Acre, 18 m. S. S. W. from Beyroot, on the N. W. slope of a promontory projecting into the Mediterranean; lat. 33° 34' N., long. 35° 21' E.; pop. 10,000, principally Moslems and Greeks. It has 6 great khans or caravansaries. The harbor was filled up by the emir Fakhr ed-Deen in the 17th century, and is now only accessible for boats. A ruinous old castle, supposed to have been built about the beginning of the Christian era, occupies a large artificial rock or mole at the mouth of the harbor, and is connected with the city by a bridge of 9 arches. The ruins of ancient Sidon are about 2 m. inland. On Jan. 20, 1855, a sarcophagus was discovered among these ruins, with a Phœnician inscription 22 lines in length, indicating that it had been the resting place of Ashmunazer, king of the Sidonians, at a date, as would seem from the enumeration of his possessions, not long after the time of Joshua. This sarcophagus is now deposited in the Louvre at Paris. In 1854 a number of pots of gold coin, of the age of Alexander the Great, were disintombed here; the whole amount was of the value of about \$40,000. The ancient necropolis was excavated in 1860 by the French

expedition under M. Renan, and important antiquarian discoveries made.—Saida or Sidon is said to have been founded by Sidon the great-grandson of Noah. Tyre was one of its earliest colonies, which soon eclipsed it in maritime power. As early as the Jewish conquest of Palestine it was surnamed the Great (*Rabbah*), and its rule at that time and later extended over the N. W. part of that country, as well as Phœnicia. It subsequently submitted to the supremacy of Tyre, was conquered by Shalmaneser in 720 B. C., was annexed to the Babylonian and Persian empires, supported the latter by its fleets, and after a revolt in 351 against Artaxerxes Ochus was betrayed by its own king, when the inhabitants destroyed the city and their own lives by fire. Having been rebuilt, it submitted without resistance to Alexander the Great and his successors. With the whole of Phœnicia it was finally annexed to the Roman empire. St. Paul touched at its port on his voyage to Rome. It was 4 times taken, plundered, and dismantled, between A. D. 1111 and 1291, and bombarded by the allied French and English fleets in 1840.

SAI-GON, or SAI-GUN, a city of Anam in Cochin China, and capital of the province of Chiampa, on the river Sai-gon, 35 m. from its mouth; pop. variously estimated from 30,000 to 120,000. Sai-gon consists of two separate towns connected by a navigable river and a good road 2 m. long. The citadel is built after the European model; it was begun by a French engineer in 1790, but has never been completed. The naval yard and arsenal at Sai-gon are the largest in the empire. The royal palace is built of brick, and there are two large Chinese pagodas in the W. part of the city. The Cambodia river communicates with the Sai-gon by a canal 25 m. long and 12 feet deep. The city was captured and occupied by the French under Admiral Charner, Feb. 24-5, 1861.

SAIL, a sheet of canvas or other fabric used by vessels to catch the wind, by which they are propelled through the water. Sails of some sort of material have been used from very remote times. The vessels of the ancient Egyptians were provided with square sails, some of which appear in their representations to have been made of papyrus, and others are said to have been of white linen. Ezekiel, in the lamentation of Tyre, xxvii. 7, says: "Fine linen, with brodered work from Egypt, was that which thou spreadest forth to be thy sail." Some of the sails were highly decorated with purple borders and rich colors, as well as embroidered with fanciful devices. The ship of the admiral, like that in which Antony and Cleopatra went to the battle of Actium, was distinguished by purple sails. They were suspended from a long yard that crossed the head of the mast, and were furled up to it when not in use. The galleys of the ancient Romans had sails of cotton and of linen of the same form, and others triangular, which also hung from a yard, and terminated below in a point. Cæsar

describes those belonging to the vessels of the Gallic Veneti as made of skins and of a thin pliant leather. The sails of these early periods appear to have been merely accessory to the oars, and not adapted for use except with a free wind. Rude nations have employed coarser materials like mats for sails, and such are still to be seen in the East Indian seas.—Sail-making is carried to great perfection in modern times as regards the materials employed, the workmanship, and the best form of the different sails. Ships are now provided with a great number of sails, instead of the single one or at most four carried by the Roman galleys. The larger are made of the heaviest No. 1 canvas, while the smaller are formed of lighter varieties running to No. 8 of the same material, known as duck of different degrees of strength. The strips of cloth are sewed together with twine, usually with a double seam, and the patterns are skilfully cut for a smooth and even fit. The edges are bound around with a rope called a bolt rope to take the strain from the canvas, and in each corner an iron ring or thimble is inserted and held fast by a rope called a cringle, which goes round the outer concave surface of the ring, and is spliced each end into the bolt rope. Through these rings are passed the ropes, called earings, by which the sail is stretched or bent to its place. The same contrivance is repeated at one or two places on the edge of the sail, that it may be shortened in single or double reefing; and on the line horizontally with these earings short lengths of cord, called reef points, are secured through the sail and hang loosely on each side, which are used when the sail is reefed to tie around the part which is taken in.—Sails may be classed as square sails and as fore-and-aft sails. The former hang by the earings from yards, and are drawn out by the lower corners or clews to the ends of the yards below. They are made to swing partly round with the yards so as to present their surface to a side wind; but the fore-and-aft sails are better designed for sailing on the wind, and the square sails for running with a free wind. The latter are attached to ropes called stays that go from the bowsprit to the foremast or from one mast to another, as the triangular jib and stay sails, or they are of quadrangular form and hang from a gaff, a stick like the boom below it near the deck, that swings one end against the mast, the other being directed aft. The head of the sail is made fast along the gaff, and the foot is secured to the boom. Shoulder of mutton sails and gaff topsails are triangular fore-and-aft sails, the foot of which may be attached to a boom or in the latter case to the gaff, and the top, by which it is hoisted, terminates in a point against the mast. Lateen sails, much used in the Mediterranean, are suspended from a very long yard, which is hoisted by the middle from the deck. One end of the yard is brought down by a brace, and the other projects above the top of the mast, and rakes with it well aft.

The sail serves very well as a fore-and-aft sail. The great superiority in the rig of American fore-and-aft vessels, by which they have been able to attain the highest speed of sailing craft, is in the great spread of their sails, their skilful cut, and perfect stretch, which causes them to keep full while their plane is more nearly in a line with the wind than could formerly be practised.

**SAILER**, JOHANN MICHAEL, a Roman Catholic theologian, born in Aresing, Bavaria, Nov. 17, 1751, died in Ratisbon, May 20, 1832. After filling the theological chair at Ingolstadt, Dillingen, and Landshut, he was in 1821 appointed prebendary in the cathedral of Ratisbon, in 1825 provost, and in 1829 bishop of that see. His most extensively circulated work is the *Gebetbuch für katholische Christen* ("Prayer Book for Catholic Christians"). A complete edition of his writings was published in 40 vols. under the editorial supervision of J. Widmer (Sulzbach, 1830-'42).

**SAILING**. See **NAVIGATION**.

**SAINFOIN** (*onobrychis sativa*, De Lamarck), a fodder plant of the natural order *leguminosæ*, growing spontaneously on the calcareous mountains of middle and southern Europe. Its roots are perennial, and are capable of penetrating to a great depth; its stems recumbent or nearly upright, 2 or 3 feet long; its leaves smooth and pinnate, each consisting of 9 to 15 leaflets, which are opposite and acute; the flower stalks are axillary, ascending, and longer than the leaves; the flowers are in tapering spikes of a beautiful pink color, and expand in June and July. The plant has been long cultivated in France, whence we obtain its common name. It was introduced into Great Britain about the middle of the 17th century, and attempts have been made to raise it in various parts of the United States, but with little success. It grows best in dry and chalky soils, and thrives only where there is an abundant admixture of lime. In most particulars it resembles lucern. (See **LUCERN**.) It is employed like clover as a forage crop.

**SAINT** (Lat. *sanctus*, venerable, sacred), a name frequently given in the New Testament to Christians. The "communion of saints," *i. e.*, of all who believe in Christ, is one of the doctrines contained in the Apostles' Creed, and, though differently interpreted, is accepted as a fundamental doctrine of Christianity by every Christian denomination. In later times, especially since the 4th century, the apostolic usage of applying the term saints to the whole membership of a congregation has fallen into desuetude, the title being restricted to persons of eminent virtue and piety. The martyrs especially were designated by this name. In the language of the Roman Catholic church the word came to designate those saints only whom the ecclesiastical authorities had declared to be such, and recommended to the people as proper objects of veneration. (See **CANONIZATION**.) Cyprian demanded that the death of a martyr

should be brought to the knowledge of the bishop, in order that it should be annually commemorated; and Origen makes the statement that the intercession of deceased saints is of great efficacy to procure for man a remission of sins. The objection of a polytheistical tendency, which was early made to this doctrine, was met by the scholastics of the Greek church by making a distinction between *λατρεία* (adoration) and *προσκύνησις* (prostration), and by those of the Latin church by distinguishing between *latría*, *dulia* (veneration), and *hyperdulia* (highest kind of veneration). The *latría*, they said, is due to none but the triune Jehovah, but the second kind of worship to the saints, their images and relics. The *hyperdulia*, which expression was for the first time used by Thomas Aquinas, is paid to none but the Virgin Mary. The controversy respecting the veneration due to the images of the saints for some time threatened the Greek and Latin churches with a general schism, until it was terminated in 787 by the 2d œcumenical council of Nice, which defined the doctrine of the worship of the saints as it is still held by the Greek, the other eastern, and the Roman Catholic churches. The Greek and the Roman Catholic churches still agree in all the principal points of this doctrine, except that the Greek church forbids the making of statues of saints. In 993 the first solemn canonization took place, and in 1170 Alexander III. forbade the worship of any new saint to be introduced without the express consent of the pope. The exact doctrine of the Roman Catholic church, according to the definition of the council of Trent (session 25), is as follows: "That the saints reigning together with Christ offer their prayers to God for man, and that it is good and useful devoutly to invoke them, and to resort to their prayers, aid, and assistance for the purpose of obtaining benefits from God through his Son Jesus Christ, who is our sole Redeemer and Saviour." The veneration of the saints also extends to their relics, which are exhibited in churches and other places, and no altar is consecrated without having in it some relics. Every child, in baptism, receives the name of one or several saints, who are its special patrons; in the same way, it has become customary to place towns and countries, arts, trades, guilds, associations, orders, &c., under the special patronage of a saint.—The biography of saints (hagiography) early became an important and much cultivated branch of ecclesiastical history, and has called forth an immense literature. The best and most complete collective work, aiming at giving a critical and documentary history of every saint invoked in the Roman Catholic church, is the *Acta Sanctorum* of the Bollandists, commenced in 1643, and not yet completed. (See BOLLANDISTS.) Among the briefer and popular works of the kind, those of Alban Butler (5 vols., London, 1745; translated into the language of nearly every Catholic nation of Europe) and of Alban Stolz

are especially valued.—The reformers of the 16th century combated the invocation of saints, and the peculiar kind of religious veneration given in the Roman Catholic church to their images, statues, and relics. But the Calvinists were more decided in their opposition and carried it further than the Lutherans, and Luther himself composed a powerful sermon against the iconoclasts of Wittenberg.

SAINT ALBANS, HARRIET MELLON, duchess of, born about 1775, died Aug. 6, 1837. She had been known to the English public as a popular comic actress, when Mr. Coutts, one of the wealthiest of the London bankers, offered her his hand and fortune. She declined the match, and urgently represented to him the disparity of years and the impropriety of such a union. The enamored millionaire however persisted in his suit, and Miss Mellon at length yielded, and soon after became a widow and sole mistress of one of the colossal fortunes of England. On June 16, 1827, she was again married to the duke of St. Albans, and when she died left to the duke an income of £10,000 per annum with a life interest in some landed estates; but the great bulk of her vast property was left to Miss Adela Burdett, daughter of Sir Francis Burdett and granddaughter of her first husband. Miss Burdett was to take the name of Coutts. (See COUTTS.)

SAINT ANDREW'S, a city and parish of Fifeshire, Scotland, on the German ocean, between the mouths of the friths of Forth and Tay, 31 m. N. E. from Edinburgh; pop. in 1851, 5,107. It is the seat of the university of St. Andrew's, founded in 1411, and comprising St. Leonard's and St. Salvator's colleges (now united) and St. Mary's divinity college. The library has about 50,000 volumes. The university is the oldest in Scotland. The Madras college was founded by Dr. Andrew Bell in 1833.

SAINT ANTHONY, a town of Ramsey co., Minn., on the E. bank of the Mississippi river, 8 m. by land N. W. of St. Paul; pop. in 1860, 8,258. It is the head of navigation on the Mississippi, and has an unlimited water power in the falls from which it takes its name. It has a state university, and a number of saw mills and manufacturing establishments. The small village of St. Anthony City adjoins it on the S., and Minneapolis (pop. in 1860, 2,564) is on the opposite side of the river.

SAINT ANTHONY'S FIRE. See ERTSIFELAS.

SAINT ARNAUD. See LEROY DE SAINT-ARNAUD.

SAINT AUGUSTINE, a city and the county seat of St. John's co., Fla., situated on the W. shore of an estuary called North river, 2 m. from the ocean, from which it is protected by a long sandy spit, 200 m. from Tallahassee, and 160 m. S. of Savannah; pop. in 1860, 1,175. The town is built on a plain but a few feet above the level of the sea. It has no trade or manufactures, and is mostly supported by the influx of invalids. The government built a

breakwater in 1840, at great cost, for the protection of the harbor. There are 3 Protestant churches and a Roman Catholic cathedral. Fort Marion, a decayed castle, built by the Spaniards more than 100 years ago, defends the port. Saint Augustine is the oldest town in the United States, a fort having been erected there by the Spaniards in 1565.

**SAINT BARTHOLOMEW**, one of the islands of the West Indies, in the Leeward group, lying 30 m. N. of St. Christopher; area, 35 sq. m.; pop. 18,000. The soil is fertile, but the island is badly supplied with water, the inhabitants depending entirely upon the rains. The products are sugar, tobacco, cotton, and cocoa. It has a good harbor, called the Carénage, on the W. side of the island, near Gustavia, the capital. St. Bartholomew was ceded by France to Sweden in 1784, and is the only colony of that power in America.

**SAINT BERNARD**, a S. E. parish of La., between the gulf of Mexico and the Mississippi river, having Lake Borgne on the N.; area, 620 sq. m.; pop. in 1860, 4,076, of whom 2,240 were slaves. The surface is level and the soil fertile, the higher portions producing large crops of sugar cane. The productions in 1850 were 4,367 hhds. of sugar and 173,000 galls. of molasses. Capital, Terre aux Boeufs.

**SAINT BERNARD, GREAT**, a mountain pass in the Pennine chain of Alps, between the Swiss canton of Valais and the Sardinian valley of Aosta. Alexander von Humboldt estimates its height at 7,957 feet. Mont Velan, its highest peak, which rises about 2,000 feet above the main summit, was ascended on Aug. 30, 1856, by Mr. Studer of Bern. At the highest elevation of the pass, between Mont Velan and its W. extremity, called Pointe de Dronaze, close upon the limits of perpetual snow, rise the solitary walls of the *hospice* or monastery of St. Bernard, the highest dwelling in the Alps. Its inmates are monks of the Augustinian order, assisted by a number of lay brethren (*marronniers*), celebrated for their exertions, in which they are aided by their famous breed of dogs, in rescuing travellers from the dangers of the region. In their hospice at times as many as 500 or 600 travellers have been accommodated at once. The snow around the hospice averages 7 to 8 feet in depth, and the drifts sometimes rest against it and accumulate to the height of 40 feet. The severest cold recorded was 29° below zero, and the greatest heat 68° F. A monastery is believed to have existed on the Great St. Bernard previous to the foundation of the present hospice by St. Bernard of Menthon, in A. D. 912. Considerable property was formerly attached to it, and its most flourishing period was at the end of the 15th century, but it now chiefly depends on public and private gifts and collections. The route over the Pennine Alps by the Great St. Bernard was traversed by Roman armies, by armies under Charlemagne and Barbarossa, and in May, 1800, by a French

army under Napoleon. A wagon road from Martigny to Liddes was completed in 1850. The governments of Sardinia and of the cantons of Vaud and Valais agreed on Aug. 11, 1853, to establish a road over the Great St. Bernard from Martigny to Aosta, by making a tunnel through the Col de Menouire.—The **LITTLE ST. BERNARD** is a mountain of the Graian Alps, S. of Mont Blanc, on the frontier of Savoy, and has a comparatively easy pass leading from the valley of the Isère into that of the Doire. On its summit, 7,076 feet above the sea, is another convent founded by Bernard de Menthon for the relief of travellers.

**SAINT CHARLES**. I. A S. E. parish of La., bounded N. by Lake Pontchartrain, and intersected by the Mississippi river; area, about 340 sq. m.; pop. in 1860, 5,297, of whom 4,182 were slaves. There are several lakes and bayous on its borders; the surface is generally level, and the soil fertile in the higher parts. The staple productions are sugar and rice. Capital, St. Charles Court House. II. An E. co. of Mo., bounded N. and N. E. by the Mississippi river and S. E. by the Missouri, and drained by Cuivre river and several creeks; area, about 480 sq. m.; pop. in 1860, 16,525, of whom 2,181 were slaves. The surface is varied, occupied in part by a range of highlands, and the soil fertile, producing large crops of grain and tobacco. There are extensive coal mines. In 1850 there were 24 churches, and 988 pupils attending schools. The capital, St. Charles, is the seat of St. Charles college (Methodist), which in 1860 had 6 professors and 50 students.

**SAINT CHRISTOPHER**, or **SAINT KITTS**, a British West India island, discovered by Columbus, in the Leeward group, 45 m. W. from Antigua, about 20 m. long, average breadth 5 m.; pop. in 1851, 23,133, of whom only 1,612 were whites. It is traversed in its entire length by a volcanic ridge, in the centre of which is Mt. Misery, an extinct volcano, 3,711 feet above the sea. The climate is healthy. The chief towns are Basse-Terre, the capital, and Sandy Point. St. Christopher, being claimed and occupied simultaneously by both the French and English, was finally ceded to the latter in 1783.

**SAINT CLAIR**, a lake lying between Michigan and Canada West, 30 m. long, with a mean breadth of 12 m., though at its widest part it is 24 m. from shore to shore; area, 360 sq. m. Its mean depth is 20 feet. It is 571 feet above the sea, or 6 feet higher than Lake Erie. Through St. Clair river, about 40 m. long and  $\frac{1}{2}$  m. wide (which forms a part of the boundary between the United States and British America), it receives the waters of Lakes Huron, Superior, and Michigan, which it discharges by the Detroit river into Lake Erie.

**SAINT CLAIR**. I. A N. E. co., of Ala., bounded S. E. by Coosa river and drained by several creeks; area, 725 sq. m.; pop. in 1860, 11,012, of whom 1,767 were slaves. It is mountainous, and has large forests of oak and



other timber, and a good soil. Extensive beds of bituminous coal are worked. The productions in 1850 were 283,877 bushels of Indian corn, 22,913 of oats, 38,054 of sweet potatoes, and 1,434 bales of cotton. There were 26 churches, and 120 pupils attending public schools. Capital, Asheville. II. An E. co. of Mich., lying on Lake Huron, St. Clair river, and Lake St. Clair, which separate it from Canada West, and drained by Bell and Black rivers; area, about 900 sq. m.; pop in 1850, 10,420; in 1860, 26,602. The surface is rolling, and much of it heavily timbered with pine and other trees. The soil is fertile in the S., and sandy in the N. and W. The productions in 1850 were 20,391 bushels of wheat, 61,833 of oats, 42,742 of Indian corn, 8,068 tons of hay, and 17,597 lbs. of wool. There were 13 churches, 2 newspaper offices, and 8,157 pupils attending schools. Capital, St. Clair. III. A S. W. co. of Ill., lying on the Mississippi river, opposite St. Louis, drained by Kaskaskia river, and Cahokia, Silver, and Richland creeks; area, 630 sq. m.; pop. in 1860, 37,694. The surface is undulating and the soil very fertile, and large quantities of grain, fruit, vegetables, and pork are raised for the St. Louis market. Along the Mississippi river there are rich coal mines. The productions in 1850 were 1,102,563 bushels of Indian corn, 224,049 of wheat, 263,197 of oats, 3,596 tons of hay, 243,976 lbs. of butter, and 20,895 of wool. There were 15 grist mills, 10 saw mills, 4 tanneries, 4 newspaper offices, and 15 churches. The Cincinnati and St. Louis railroad passes through the county. Capital, Bellville. IV. A W. co. of Mo., intersected by Osage river, and drained by Sac river and several creeks; area, 650 sq. m.; pop. in 1860, 6,809, of whom 574 were slaves. The surface is varied, partly prairie and partly timber, and the soil tolerably fertile. The productions in 1850 were 126,615 bushels of Indian corn, 13,208 of wheat, 56,282 of oats, and 638 tons of hay. There were 4 churches, and 200 pupils attending schools. Capital, Osceola.

**SAINT CLAIR, ARTHUR**, an American general, born in Edinburgh, Scotland, in 1735, died near Greensburg, Penn., Aug. 31, 1818. In 1759 he came to America with Admiral Boscawen, served as lieutenant in Canada under Gen. Wolfe during 1759 and 1760, and after the peace of 1763 commanded Fort Mifflin in Pennsylvania. In Jan. 1776, he was created a colonel in the continental army, with power to raise a regiment to serve in Canada; and in 6 weeks after his appointment he was ready with his troops to take the field. In August he was made brigadier-general, and in that capacity was present at the battles of Trenton and Princeton. In Feb. 1777, he was created major-general, and in June took command of Ticonderoga by order of Gen. Schuyler. Although his garrison of 2,000 men was badly equipped, he supposed he would be able to hold the post; but Burgoyne's troops having gained possession of Sugar hill, a point which he had

neglected to fortify, he was compelled to evacuate it in haste and with great loss. He served during the following years in various parts of the country, and in 1781 remained at Philadelphia to protect congress while Washington marched to the siege of Yorktown, but was allowed to join the main army before Cornwallis was taken. From that place he joined Greene at Jacksonville, Ga., with reinforcements. After the peace he resided in Pennsylvania, and was sent in 1786 to congress, of which he became president in 1787. When in 1789 the government of the North-West territory was organized, he was made governor, and held that post until 1802. In 1791 he was made major-general, became general-in-chief of the army, and was intrusted with the command of the expedition against the Miami Indians. The last words of Washington to him were: "Beware of a surprise!" St. Clair was surprised, however, on Nov. 4, near the Miami villages, and his force of 1,400 ill-disciplined men was cut to pieces. Washington refused a court of inquiry on the ground of a deficiency of officers of rank competent to form such a court, and St. Clair resigned his commission. When he was removed from his post of governor, he was almost ruined in fortune, and died nearly penniless, having made many unsuccessful applications to congress for the payment of certain claims.

**SAINT CLOUD**, a French village, 5 m. W. of Paris (pop. 3,828), the site of a famous palace first built by Gondi in 1572. It became the property of the duke of Orleans in 1658, who repaired it and caused the gardens to be laid out anew by Le Nôtre. It was purchased by Louis XVI. for Marie Antoinette in 1782. It was a favorite residence with Napoleon I., as it is with Napoleon III.

**SAINT CROIX**. I. Called also **PASSAMAQUODDY** and **SCHOONIC**, a river which forms a portion of the N. E. boundary between the United States and British America. It rises in Grand Lake, and flows in a very winding course, though generally in a S. S. E. direction, for about 75 m., separating Maine from New Brunswick, and falling into Passamaquoddy bay. II. A river of Wis., rising in La Pointe co., near the W. part of Lake Superior, and flowing S. W. to the E. line of Minnesota, where it becomes the boundary between that state and Wisconsin. Its general direction in this part of its course is S., and it falls into the Mississippi, 38 m. below St. Paul's. Its whole length is about 200 m., and its width at its mouth 100 yards. An expansion in the lower part of its course, for about 36 m., is called St. Croix lake. The river has several fine falls.

**SAINT CROIX**, a N. W. co. of Wis., separated by the St. Croix river from Minnesota, and drained by Willow, Apple, and Rush rivers; area, 750 sq. m.; pop. in 1850, 624; in 1860, 5,393. The surface is uneven, and most of it covered with pine forests. Capital, Hudson.

**SAINT CYR, LAURENT GOUVION**. See **GOUVION SAINT CYR**.

**SAINT DENIS**, a town of France, department of the Seine, 5 m. N. of Paris; pop. in 1856, 18,110. Its origin is traced to the 7th century, when Dagobert I. built here in 632, over the grave of St. Denis, an abbey which soon became the wealthiest and most renowned in France. One of its manors was held in fief by some of the first Capetians, and for this reason they adopted as their standard the *oriflamme*, originally the banner of the convent, and chose the crypt of the church as their burial place. In 1793, by order of the convention, the tombs of the kings were destroyed and their remains transferred elsewhere. The church was restored by order of Napoleon, and now ranks among the best preserved architectural monuments of France. The buildings of the convent are occupied by an establishment for the education of 500 girls, orphans of the members of the legion of honor.

**SAINT DOMINGO.** See HAYTI.

**SAINT ELME, IDA** (ELISLINA VANAYL DE YONGH), the *nom de plume* of a French courtesan and authoress, born at Valambrose, in the south of France, in 1778, died in Brussels in 1845. She is known chiefly by her publication entitled *Mémoires d'une contemporaine* (8 vols., Paris, 1827), purporting to contain her recollections of eminent personages under the republic, the consulate, and the empire. As the mistress of several of Napoleon's generals and marshals, she professed to have peculiar facilities for relating the secret history of the period, and her book, from the scandalous character of many of the alleged revelations, had an immense success. Her subsequent writings, including *Fragments et épisodes contemporains* (Marseilles, 1828), *La contemporaine en Égypte* (6 vols., Paris, 1831), *Mes dernières indiscretions* (2 vols., Paris, 1833), &c., are greatly inferior to her first work. After the French revolution of 1830 she took up her residence in London, and a few years later made an attempt to levy black mail upon Louis Philippe by forcing him to purchase letters written by him in 1809, and which seriously compromised his character for patriotism. She died in the hospital of the Ursuline nuns in Brussels, where she was for some time supported by private charity.

**SAINT ÉTIENNE**, a city of France, since 1855 chief town of the department of the Loire, situated on the Furens, a branch of the Loire, 802 m. S. E. from Paris, and 32 m. S. W. from Lyons, with which it is connected by railway; pop. in 1856, 99,677. It is the centre of a great manufacturing district, and has, beside the largest imperial armory in France, manufactories of firearms, locks, hardware, cutlery, tools, anvils, and also of ribbons, velvets, laces, tulles, and galloons. In the suburbs are large forges, steel works, brass and iron founderies, &c. St. Étienne began to be of some importance in the 15th century. It suffered from the plague in 1585 and 1628. Its principal growth has been within the past 30 years; in

1801 it had but 16,000 inhabitants, and in 1846 but 49,619.

**SAINT EUSTATIUS**, a Dutch West India island, in the Leeward group, 12 m. N. W. from St. Christopher; area, 190 sq. m.; pop. in 1858, 1,936. This island is but a conical mountain, with a hollow in the centre which seems to be the crater of an extinct volcano. It is very fertile and highly cultivated. The Dutch took possession of St. Eustatius in 1635. It was subsequently taken and retaken several times by the English and French, but was restored to its first possessors in 1814. It is a dependency of the government of Curaçoa.

**SAINT ÉVREMOND, CHARLES MARGUETEL DE SAINT DENIS**, seigneur de, a French author, born at Saint Denis Dugast, near Coutances, Normandy, April 1, 1613, died in London, Sept. 20, 1703. He early entered the army, and distinguished himself as lieutenant, but was obliged by the prince of Condé, on account of some witticisms against that general, to resign. During the war of the Fronde he served Mazarin with sword and pen; but having again turned his wit against his master, he was imprisoned in the Bastille for 3 months, when he was restored to favor. In 1661, after the death of Mazarin, a letter of his offensive to the government fell into the hands of Colbert, and he fled to Holland and thence to England, where he passed the remaining 42 years of his life, Louis XIV. refusing to let him return. Charles II. gave him a pension of £300, and James II. offered him public employment, which he declined. Before his exile he had set the tone of society in France among men of pleasure, and in London he lived as a literary courtier and fastidious voluptuary, forming the soul of the elegant society around the beautiful duchess of Mazarin. Of his numerous verses only a quatrain on Ninon de l'Enclos, with whom he was intimate, is remembered; while his prose writings are still held in esteem, especially his *Conversation du père Canaye*, *Observations sur Salluste et sur Tacite*, and *Réflexions sur les divers génies du peuple Romain*. The first correct edition of his works is that of Des Maizeaux (3 vols. 4to., London, 1705; 4th ed., 5 vols. 12mo., Amsterdam, 1724), who also translated them into English and wrote his life. His *Œuvres choisies* were published with a life by Désessarts (12mo., Paris, 1804).

**SAINT FRANÇOIS**, an E. co. of Ark., lying between the St. Francis and White rivers, and drained by the Cache river; area, about 900 sq. m.; pop. in 1860, 8,673, of whom 2,622 were slaves. The surface is nearly level, and the soil productive. The White and St. Francis rivers are navigable along its borders. The productions in 1850 were 181,442 bushels of Indian corn, 54,493 of oats, and 1,540 bales of cotton. Capital, Mt. Vernon.

**SAINT FRANÇOIS**, an E. S. E. co. of Mo., drained by the Big river, a branch of the Maramée, and the sources of the St. Francis;

area, 350 sq. m.; pop. in 1860, 7,248, of whom 818 were slaves. The surface is broken and hilly, and includes within it a portion of the Iron mountain. It has extensive iron works, and is connected with the Mississippi by railroad. The productions in 1850 were 226,759 bushels of Indian corn, 14,741 of wheat, and 32,191 of oats. Capital, Farmington.

SAINT GALL, a N. E. canton of Switzerland, bounded N. by the canton of Thurgau and the lake of Constance, E. by the Rhine, S. and S. W. by the cantons of Grisons and Glarus, and W. by Schwytz and Zürich, and enclosing the canton of Appenzell; area, 780 sq. m.; pop. in 1850, 169,625, of whom  $\frac{2}{3}$  were Catholics. It is divided into 15 districts. St. Gall is the capital, and the other principal towns are Sargans, Werdenberg, Lichtensteig, Rapperschwyl, Flawyl, Wyl, and Rorschach. It is watered by affluents of the Rhine, the largest of which are the Thur, the Necker, the Sitter, and the Goldach. Lake Wallen is almost entirely in this canton, and the lakes of Constance and Zürich are on its boundaries. The S. part of the canton is one of the lofty Alpine regions of Switzerland, Mounts Scheibe, Graue Horn, and Speerberg being within its limits. The whole surface of the canton is mountainous. There are no minerals of importance, but there are mineral springs at Pfeffers or Pfäfers. The soil is generally fertile. The mountainous districts are covered with wood or rich pasture, and on the lower slopes are vineyards and orchards. Woollen, linen, and cotton goods, especially fine muslins, are manufactured. The government of the canton is democratic. The great council is composed of 88 Catholics and 62 Protestants, elected for 2 years, and meeting twice a year. The little or executive council is composed of 7 members, chosen by the great council from their own number and holding office 4 years. The revenue of the canton is about \$100,000. The canton was admitted to the confederation in 1803.—SAINT GALL, the capital, is situated on the Steinach, a branch of the Sitter, 18 m. S. E. from Constance, and 40 m. E. from Zürich, 2,152 feet above the level of the sea; pop. in 1850, 11,234. It is a walled city, flanked with towers, but the ditches have been filled up and converted into gardens. It has numerous fountains, a cathedral, and extensive manufactories of woollen, linen, and fine muslins. The suburbs are finely laid out, and command extensive and beautiful views. The city is said to have been founded in the 7th century by a Scottish monk, who built here the abbey of St. Gall, famous in the middle ages, and around which a town gathered. The city was received into the Helvetic confederation in 1454. The abbots of the monastery endeavored to rule it, but failed, and the abbey was secularized in 1805.

SAINT GENEVIEVE, an E. S. E. co. of Mo., bounded N. E. by the Mississippi river, and drained by Rivière aux Vases, Isle au Bois, Saline, and Establishment creeks; area, about

400 sq. m.; pop. in 1860, 8,029, of whom 617 were slaves. The surface is broken and hilly, and the soil of the low lands and valleys is fertile. There are quarries of marble, and valuable mines of lead and copper. The productions in 1850 were 195,214 bushels of Indian corn, 30,183 of wheat, and 34,413 of oats. There were 8 churches, 2 newspaper offices, and 305 pupils attending schools.—Sr. GENEVIEVE, the capital, is situated on the Mississippi river, 61 m. below St. Louis; pop. in 1860, 1,291. It exports considerable quantities of lead, copper, limestone, and a fine white sand used for glass-making. It has 2 newspapers, a Roman Catholic church, and an academy. St. Genevieve was settled in 1755 by the French, and most of its inhabitants are of French descent.

SAINT GERMAIN, or ST. GERMAIN-EN-LAYE, a town of France, department of Seine-et-Oise, 10 m. W. N. W. from Paris, and 6 m. N. from Versailles; pop. in 1856, 14,283. It has an ancient royal castle, in which, or the buildings formerly connected with it, Henry II., Charles IX., Louis XIV., and Madeleine and Margaret of Valois, daughters of Francis I., were born. Here James II. of England kept up his mimic court after his expulsion from England, and here he died in 1701. Horsehair goods, cotton, woollen, hosiery, patent leather, &c., are manufactured. The town dates from the 10th century, and a convent in the forest near it, called Ledia, was founded about the same time. The present castle was built in 1370 by Charles V., and enlarged and improved by his successors. It was made a prison during the revolution, and a military penitentiary from 1830 to 1853. The forest of St. Germain is one of the finest in France, including a tract of 8,900 acres, traversed by drives having an aggregate length of about 1,000 m.

SAINT GERMAIN, Count of, an adventurer of the 18th century, born perhaps in 1710, died in Schleswig in 1784. A mystery enveloped his birth and origin of which he took every advantage. He spoke English, German, Italian, Spanish, and Portuguese to perfection, and French with a slight Piedmontese accent; and he was variously thought to be the son of a tax collector at San Germano, Savoy, an Alsatian Jew, a Portuguese marquis named Betmar, or the illicit offspring of a Spanish princess. After sojourning in various cities of Italy under as many pseudonyms, he appeared in 1745 at the French court under the patronage of Marshal de Belle-Isle, and, having a fine personal appearance and address, considerable erudition, and a wonderful memory, became a favorite of Mme. de Pompadour and the king. He occupied for many years a remarkable social position at the French court, and, by a liberal display of money and jewelry and a careful attention to the rules of hygiene, passed for the possessor of the philosopher's stone and of an elixir which rendered him immortal. He was in the habit of telling the credulous that

he had lived 350 years, and some old men, who pretended to have known him in their youth, declared that in 60 or 70 years his appearance had in no wise changed. Frederic the Great, having asked Voltaire for some particulars respecting this mysterious person, was told that he was "a man who never dies and who knows every thing." He passed the last years of his life at the court of the prince of Hesse-Cassel. He is supposed to have been employed during the greater part of his life as a spy at the courts at which he resided.

SAINT HELENA, an E. parish of La., lying between the Amite and the Tangipahva rivers, and drained by the Tickfah river and Natalbany creek; area, 540 sq. m.; pop. in 1860, 7,130, of whom 3,711 were slaves. The surface is gently undulating and the soil fertile, especially along the streams. The New Orleans and northern railroad passes through the eastern portion of the county. The productions in 1850 were 1,284 bales of cotton, 109,751 bushels of Indian corn, and 44,225 of sweet potatoes. There were 6 saw and planing mills, 11 churches, and 355 pupils attending public schools. Capital, Greensburg.

SAINT HELENA, an island, belonging to Great Britain, in the S. Atlantic ocean, about 1,200 m. W. from Africa and 1,800 m. E. from South America; lat.  $15^{\circ} 55' S.$ , long.  $5^{\circ} 42' W.$ ; extreme length,  $10\frac{1}{2}$  m.; breadth, 7 m.; area, about 47 sq. m.; pop. in 1857, 5,490. Rugged and precipitous cliffs from 600 to 2,000 feet high encircle the island, giving it the appearance from a distance of a mass of lofty, sterile rocks. Occasional openings occur along the shore, forming inlets by which it can be approached. Of these the principal are James's bay, having an excellent harbor, on which is Jamestown; Rupert's and Lemon valley on the N. W., and Sandy bay on the S. E., all strongly fortified. Beside these there are narrow ravines where landing is possible, which are also protected by forts. The island is intersected by a lofty ridge of calcareous rocks, running nearly E. and W. with a bend to the S. at each extremity. Near the centre of the island and in this range is Diana's peak, 2,700 feet high. Cuckold's point, 2,672 feet, and Halley's mount, 2,467 feet, are likewise in this range. The Flagstaff, 2,272 feet, and Barns-cliff, 2,015 feet, are prominent cliffs on the coast. Scattered along the S. coast are many remarkable columns or basaltic rocks, two of which, Lot and Lot's wife, are respectively 197 and 160 feet high, and the Chimney, a noted hexagonal column, is 64 feet. There are several plains, of which Longwood, the largest, comprises 1,500 acres. Of a total area of 30,244 acres, only 492 are under cultivation, and 7,652 devoted to grazing. The climate is by some stated to be temperate and salubrious and not unhealthy to European constitutions, but by others this is denied. At Jamestown, 600 feet above the sea, the temperature is generally about  $80^{\circ}$ ; and, according to English au-

thorities, throughout the island, with the exception of the valleys during calms, it is very equable and moderate. Iron, gold, and copper have been found in small quantities. The island is evidently of volcanic origin, as there are traces of a crater on the S. side, from which lava and other volcanic matters have flowed in every direction, the other side having, it is supposed, sunk into the ocean. Occasionally earthquakes have been felt, and at times the surrounding sea has been violently agitated.—The island was the residence of Napoleon during his exile, from Oct. 16, 1815, until his death, May 5, 1821. The house which he occupied is at Longwood, on an elevation 1,762 feet above the sea. His remains were deposited at his own request in a small valley which had been one of his favorite resorts, and a piece of rising ground about 100 feet in diameter was selected for his burial place. This was enclosed with a wooden palisade, and the grave was covered with 3 flat stones and surrounded by a high iron railing. His body was exhumed in Oct. 1840, and conveyed to France, by an expedition under command of the prince de Joinville. Having been enclosed in Roman cement, the remains were in a good state of preservation, the countenance being readily recognizable.—The island was discovered on St. Helena's day, May 21, 1501, by Juan de Nova Castilla, in the service of the Portuguese, by whom its situation was concealed until 1588, when it was visited by Cavendish in one of his voyages. Subsequently the Portuguese either abandoned it or were driven from it by the Dutch, who left it in 1651 on the establishment of their colony at the cape of Good Hope. A short time after it was settled by the East India company, who in 1665 were expelled from it by the Dutch; but regaining it in a few months, they kept possession till 1672, when it was again taken by the Dutch, who, however, were almost immediately driven off by the arrival of an English squadron. The supreme authority is vested in a governor and a council composed of the lieutenant-governor, the colonial secretary, and chief justices. When the council is not assembled the whole authority of the board centres in the governor.

SAINT HELIER, a fortified town in Jersey, capital of the island, on the S. coast, at the E. side of St. Aubin's bay; pop. 30,000. It is situated at the foot of some low hills which slope toward the bay. There is a considerable shipping trade, chiefly with Newfoundland. Ship building is carried on, and there are several foundries. The climate is mild and agreeable.

SAINT HILAIRE, AUGUSTE DE, a French botanist and traveller, born in Orleans, Oct. 4, 1799, died in Paris in 1853. He accompanied the duke of Luxembourg to Brazil for the purpose of making a botanical exploration of that country, and during six years traversed the central and S. W. provinces, and the ancient missions on the left bank of the Paraguay.

The results of his investigations are embodied in several valuable works.

SAINT HILAIRE, GEOFFROY. See GEOFFROY SAINT HILAIRE.

SAINT HILAIRE, JULES. See BARTHÈLEMY ST. HILAIRE.

SAINT HILAIRE, MARCO DE, the pseudonym of ÉMILE MARC HILAIRE, a French writer, born about 1790. At an early age he became one of the pages of Napoleon I., and after the restoration engaged in writing for the booksellers essays on the way to make a fortune, to smoke and take snuff, to dine out, to pay one's debts and succeed in love, &c., and brief biographies of distinguished or notorious personages; he also wrote several unsuccessful romances. After the revolution of 1830 he produced a great number of anecdotal, biographical, and historical works relating to Napoleon and the empire, such as *Mémoires d'un page de la cour impériale* (Paris, 2 vols. 8vo., 1830; new ed., 1847); *Souvenirs de la vie privée de Napoléon* (1838); *Les aides-de-camp de l'empereur* (1841); *Histoire populaire de Napoléon et de la grande armée* (large 8vo., illustrated, 1842); *Histoire de la garde impériale* (1845-'7; 2d ed., 1849); *Histoire de la campagne de Russie* (4 vols. 8vo., illustrated, 1846-'8), &c. More recently he has written *Histoire des conspirations et des exécutions politiques* (4 vols. large 8vo., illustrated, 1849), including France, England, Spain, and Russia; a continuation of Anquetil-Duperron's *Histoire de France* to 1850; *Histoire de Napoléon III.* (8vo., 1853); and *La caserne du quai d'Orsay* (1856). He has edited the *Almanac impérial* since 1847.

SAINT HYACINTHE, a city of Canada East, capital of St. Hyacinthe district, situated on the Yamaska river in St. Hyacinthe co., 80 m. from Montreal, and 137 from Quebec; pop. about 5,000. It is pleasantly situated, and has the St. Hyacinthe college under the direction of the Jesuits, a fine stone edifice over 700 feet long, with a library of 7,000 volumes, 23 professors, and 343 students; a nunnery, with a female seminary of 100 pupils; and a hospital under the charge of the sisters of charity. The grand trunk railway passes through the city.

SAINT JAMES, a S. E. parish of La., having Lake Maurepas on the N. E. and intersected by the Mississippi; area, 330 sq. m.; pop. in 1860, 11,504, of whom 8,095 were slaves. The surface is level and the soil fertile. The plantations are chiefly on the river. The productions in 1850 were 21,670 hhd. of sugar, 926,488 galls. of molasses, and 334,480 bushels of Indian corn. Capital, Brangiers.

SAINT JOHN, or St. John's, a river of Maine and the province of New Brunswick, British America, called by the Indians Loosh-took (*i. e.*, Long river), which takes its rise, under the name of the S. W. branch, in the highlands which separate Maine from Canada, near the little village of Metjarmette. It flows due N. E. to the junction of the St. Francis, a distance of about 150 m., for 100 m. of which

it is known as the Wolloostook. From the mouth of the St. Francis its course is irregularly E. S. E. to the Grand falls, where it has a perpendicular descent of 70 or 80 feet, thence nearly S. to lat. 46° N., when it turns suddenly and flows E. for 100 m. to the entrance of the outlet of Grand lake, thence in a broad channel due S. to Kingston, then S. S. W. to Westfield, and finally S. E. to St. John's harbor. Its whole course is about 450 m., of this 225 m. of the lower portion is wholly within British territory; 75 m. from the Grand falls to the St. Francis forms the boundary between Maine and New Brunswick; the next 112 m. is in Maine; and from its source to lat. 46° 25' N., long. 70° 4' W., it forms the boundary between Maine and Canada East. It has 11 principal affluents, the largest being the Allegash, St. Francis, and Aroostook, beside many smaller ones. It is navigable for vessels of 120 tons to Fredericton, 80 m. from its mouth; small steamboats ascend to Woodstock, 65 m. further, and even at times to the Grand falls, 225 m. from its mouth; above this point it is navigated by steamboats 40 m. Its falls afford a vast water power. With its branches it furnishes 1,300 m. of navigable waters, and drains 17,000,000 acres.

SAINT JOHN, or St. John's, a city and seaport of New Brunswick, capital of St. John co., situated on a rocky promontory at the mouth of St. John's river, 135 m. N. W. from Halifax, N. S.; lat. 45° 14' 6" N., long. 66° 3' 30" W.; pop. in 1852, 22,745. The city is well built, its houses being mostly of brick or stone, and the streets straight and regular, though some of them are very steep. It is divided by a projecting rock into two parts, called the upper and lower coves, the former containing the principal wharfs and warehouses. The chief public buildings are the Episcopal and Presbyterian churches, the marine hospital, the government barracks and storehouses, the court house, and the provincial prison. It has 18 or 20 churches, a grammar and other schools, 2 public libraries, and several newspaper offices and charitable and commercial institutions. The harbor is one of the finest in America, and never blocked with ice. There is a peculiar phenomenon at the entrance of the river just above the city; the stream, discharging an immense body of water, is forced through a narrow gorge, 80 yards wide and 400 long, and makes a fall of about 17 feet. The tide rises ordinarily 21 feet, but at the vernal equinox 25 feet. At ebb tide the waters of the river are about 12 feet higher than those of the harbor; at flood tide they are 5 feet lower, while for about 15 or 20 minutes of each ebb and flow of the tide they are at the same level, during which vessels can pass the falls, but at no other time. The country of which St. John is the port of entry is rich in minerals, building stone, timber, and agricultural products. The number of vessels belonging to the port, Dec. 31, 1855,

was 566, tonnage 110,451. The number of arrivals in 1852 was 1,740, tonnage 384,267, and the number of clearances 1,746, tonnage 362,917. Ship building is its most important branch of industry. St. John was founded by American loyalists who left the United States at the close of the revolution.

SAINT JOHN, HENRY. See BOLINGBROKE.

SAINT JOHN. I. JAMES AUGUSTUS, an English author, born in Caermarthenshire about the beginning of the 19th century. Having acquired a knowledge of the classics and of the French, Italian, Spanish, and Arabic languages, he went to London at the age of 17, and commenced writing for the press. He edited for some time an ultra liberal newspaper at Plymouth, published a poem entitled "Abdallah," and became connected with James Silk Buckingham as sub-editor of the "Oriental Herald," for which he wrote a history of the rise and progress of the British power in India. In 1829 he went to Normandy, resided in various places in France and Switzerland till 1832, when, leaving his family in Lausanne, he explored, in great part on foot, Egypt, Sicily, and southern Italy, and returned to England in 1834. In 1835 he settled in the forest of Chantilly, where he wrote his chief work, the "History of the Manners and Customs of Ancient Greece" (3 vols. 8vo., London, 1842), during the progress of which he became nearly blind, and was assisted by his son Bayle St. John as amanuensis. Among his other works are: "Description of Egypt and Nubia" (8vo., 1834); "History, Manners, and Customs of the Hindoos" (2 vols., 1834-5); "Isis, an Egyptian Pilgrimage" (2 vols., 1852); "The Nemesis of Power: Forms and Causes of Revolutions;" "There and Back again in search of Beauty: Italy" (2 vols. 8vo., 1853); "Philosophy at the Foot of the Cross" (12mo., 1855); and "History of the Four Conquests of England, Roman, Anglo-Saxon, Danish, and Norman" (2 vols. 8vo., 1861). He has also published three novels entitled "Tales of the Ramad'han," "Margaret Ravenscroft," and "Sir Cosmo Digby." II. BAYLE, son of the preceding, born in London in 1822, died there, Aug. 1, 1859. He first appeared in print in a magazine article at the age of 13, and from that time continued to write for magazines and newspapers, although he studied for some time with the design of becoming an artist. In 1844 he published a novel, "The Eccentric Lover," and aided in establishing the ethnological and Syro-Egyptian societies. He went to Egypt in 1846, visiting France, Italy, and Sicily on the way, and remained there nearly two years, and during that time crossed the desert to the oasis of Siwah for the purpose of studying the route of Alexander the Great. He next spent two years in Paris, then another year in Egypt, and afterward resided principally in Paris. His chief works are: "Adventures in the Libyan Desert;" "Manners and Politics in the Ottoman Empire;" "Two Years' Residence in a Levantine Family;" "Views in the

Oasis of Siwah" (fol.); "The Subalpine Kingdom," containing new and curious documents on the life of Rousseau: "Purple Tints of Paris: Sketches and Manners;" "The Turks in Europe" (1853); "The Louvre, or Biography of a Museum" (1855); "Legends of the Christian East" (1857); "Montaigne the Essayist" (1857), &c.—Two other brothers are known in the literary world: PERCY, as the author of a novel entitled "Paul Peabody," and of numerous tales; and HORACE, as the author of a "History of the Indian Archipelago" (2 vols. 8vo., 1858), a "History of the British Conquests in India" (2 vols. 8vo.), and a "Life of Columbus," and as editor of "The Leader." The three brothers in 1854 commenced the "Utopia, a Political, Literary, and Industrial Journal," which soon ceased.

SAINT JOHN BAPTISTE, a S. E. parish of La., bordering on Lakes Maurepas and Pontchartrain, and intersected by the Mississippi river; area, 200 sq. m.; pop. in 1860, 7,932, of whom 4,596 were slaves. The surface is low and in many places marshy. The productions in 1850 were 188,390 bushels of Indian corn, 314,200 lbs. of rice, 638,230 gallons of molasses, and 11,935 hogsheads of sugar. Capital, Bonnet Carré.

SAINT JOHN OF JERUSALEM, KNIGHTS HOSPITALERS OF THE ORDER OF, a religious and military body, which originated in the middle of the 11th century. In 1058 a number of Italian merchants, natives of Amalfi, established an asylum for Latin pilgrims at Jerusalem, by permission of the caliph of Egypt. This establishment consisted of a chapel, erected near the site of the holy sepulchre, and of two hospitals, one for each sex; and finally to each of these hospitals was added a chapel, that for men being dedicated to St. John the Almonef, a Greek, who had been patriarch of Alexandria in the 7th century, and who had succeeded the Christians of the holy city when they became the victims of the Saracens. A number of pilgrims entered the hospital, and devoted themselves to its service. It received large contributions from Europe, particularly from Italy, and soon became wealthy. When the first crusade was undertaken, Peter Gerard was rector of the hospital, which was then merely a secular institution, and which succored infidels as well as Christians. After the conquest of Palestine, the hospitalers experienced high favor from the crusaders, many of whom, following the example of Godfrey of Bouillon, bestowed landed property in Europe upon it. Some of the crusaders joined it, which led Gerard to organize it as a regular religious body, the members of which took the vows of obedience, chastity, and poverty, beside devoting the remainder of their lives to the service of the poor and the sick in the Latin kingdom of Jerusalem. Their dress was a plain black robe, having an 8-pointed white cross on the left breast. In 1113 Pope Paschal II. sanctioned the order by a bull, conferring special

privileges on it. Gerard, now first superior, established branch hospitals in different parts of Europe, which discharged the same offices to pilgrims there that were performed for them by the parent institution in Palestine. Gerard dying in 1118, Raymond du Puy, a gentleman of Dauphiné, was unanimously chosen his successor. He was a man of strong martial tastes, and he proposed to his brethren that, while they should still retain all the vows they had previously taken, they should add to them that of bearing arms in defence of religion. A proposition so strictly in accordance with the spirit of that age was promptly acceded to, and the order became a military fraternity, and was organized as such by De Puy, first grand master, who impressed his character upon it. "Having," says its latest historian, "been originally organized for charitable purposes only, it successively received the character of a religious, republican, military, and aristocratic constitution. It must be considered as religious, since every member took the three vows of chastity, obedience, and poverty; it was republican, since by the original constitution of the order their chief was always selected from among themselves, by their own nomination; it was military, since two of the three classes into which it was divided were constantly armed, and waged an unceasing war with the infidels; and it was aristocratic, since none but the first class had any share in the legislative and executive power." Rising rapidly to fame as a military body, and to opulence from the gifts of pious persons, the order was distinguished for its valor in the wars with the Saracens. It was nearly annihilated in the battle of Tiberias (1187). After the fall of Jerusalem, it was established at Margat, the female branch of the order retiring to Europe. The site of the original hospital at Jerusalem was lately bestowed by the sultan of Turkey upon the Franks, in gratitude for the assistance he received from them in the last Russian war. The knights were involved in disputes and hostilities with the templars, to the damage of both orders; but they continued to serve valiantly against the infidels. At the battle of Gaza, in 1244, both orders were nearly exterminated by the Kharizmians. When Acre fell into the hands of the Saracens (1291), the hospitallers were established at Limisso, in Cyprus, where they were recruited by drafts on the European commanderies. In this insular residence originated their naval character, as their vessels conveyed pilgrims to the Holy Land. This led to sea fights, in which the brethren became as distinguished for skill and valor as they had been on land. An expedition to Palestine, in which they were allies of the king of Persia, led to no results. In 1309 the order seized Rhodes, which had been the seat of Mussulman corsairs, and soon converted that island into so strong a Christian bulwark, that it gave its name to the fraternity. They held the island for more than two centuries,

though it was several times assailed by the Mussulmans. They took Smyrna, and retained possession of the place until it was taken by Tamerlane. In most of the actions with the infidels members of the order were present, and in the battle of Nicopolis (1396) they saved the king of Hungary from death or captivity. The first siege of Rhodes by the Turks took place in 1480, when it was successfully defended by the grand master Peter D'Aubusson. The second siege, in 1522, was attended with a different result, though the grand master, Philippe Villiers de L'Isle-Adam, held the Turks at bay for 6 months, and was admitted to honorable terms by Sultan Solymán the Magnificent. The remnants of the order proceeded first to Candia, then to Messina, and then to the mainland of Italy. Charles V. ceded the islands of Malta and Gozzo, and the city of Tripoli, to the order, March 24, 1530. Malta was then a barren rock, but the knights made it one of the strongest places in the world; and they carried on the war with the Turks, then the dread of Christendom, with so much energy that their new abode furnished them with a new name, that of knights of Malta. The Turks attacked the island in 1551, but failed to take it. They renewed the attack in 1565, with an armament calculated to command success; but the grand master, Jean Parisot de la Valette, defended the island for nearly 4 months, and the besiegers were compelled to depart. This defence, which was marked by the most romantic incidents of war, raised the fame of the order to its height; and for nearly 2½ centuries more it enjoyed the world's esteem. In the long conflict that the Mediterranean saw between the Mussulmans and the Christians, the knights were distinguished for the valor with which they contended against the followers of the crescent; but at the close of the 18th century this quarrel was at an end, and the order encountered the enmity of France, then governed by the revolutionists. Bonaparte, when on his way to Egypt, seized Malta, June 12, 1798. Russia became the protector of the order, the czar Paul being made grand master; but since 1798 it has been able to maintain but a shadowy existence, the last relic of the age of the crusades and of chivalry.

SAINT JOHN'S, a N. E. co. of Fla., lying between the St. John's river and the Atlantic, and drained by the St. John's and its affluents; area, 990 sq. m.; pop. in 1860, 3,039, of whom 1,003 were slaves. The surface is flat and much of it marshy. There are some live oaks. The productions in 1850 were 14,390 bushels of Indian corn, 290 hhds. of sugar, and 6,325 galls. of molasses. Capital, St. Augustine.

SAINT JOHN'S, a city of Newfoundland, capital of the island and colony, and the easternmost seaport of North America, situated near the end of the most eastern of the numerous peninsulas of Newfoundland, 70 m. from Cape Race, in lat. 47° 33' 6" N., long. 52° 43' W.; pop. in 1852, 21,000. The town is built



on an acclivity, and consists of one long irregular street, with a number of lanes opening into it. The principal public buildings are the government house, a large structure which cost \$175,000; the house of assembly, a fine granite building; a Roman Catholic cathedral, a lunatic asylum, hospital, and custom house. It has 9 or 10 churches, 5 schools, several benevolent societies, a mechanics' institute, with museum, library, and reading room attached, an agricultural society, a net and other manufactories, a botanic garden, and a marine promenade. The wharfs and stages for drying fish, which line the shore, are a peculiarity of the town. The harbor is a very fine one, and capable of thorough defence against any invading force, from the formidable batteries which command the narrows at its entrance, which are only 580 feet wide and 600 long, with 12 fathoms water. The anchorage inside is excellent and spacious, with no perceptible tides. The trade of the town is mostly with the fishermen, whom it supplies with clothing, provisions, and fishing materials, and with merchant vessels from Great Britain, continental Europe, the United States, and the West Indies, which it supplies with fish, seal skins, oil, and blubber. Codfish is the great staple of export, and of this it sends out annually to market from 500,000 to 1,000,000 quintals; but considerable quantities of salmon, herring, seal and whale oil, cod liver oil, blubber, and seal skins are also exported. The number of vessels arriving at St. John's in 1851 was 842, tonnage 103,016, and the number cleared was 703, tonnage 91,191. The large dogs of the country are much employed in the town for hauling wood, &c. St. John's was founded in 1583 by Sir Humphrey Gilbert.

SAINT JOHN'S RIVER. See FLORIDA, vol. vii. p. 566.

SAINT JOHNSBURY, a town of Vermont, capital of Caledonia co., on the right bank of the Passumpsic river, 37 m. N. E. from Montpelier; pop. in 1860, 2,758. It is divided into 3 villages, the Centre, East, and Plain, the last the largest. It has 9 churches, an academy, high school, bank, printing office, 4 founderies and machine shops, and the extensive manufactory of platform and other scales of Messrs. Fairbanks. The Connecticut and Passumpsic rivers railroad passes through the town.

SAINT JOSEPH. I. A S. W. co. of Mich., bordering on Indiana, and drained by the St. Joseph's, Portage, Prairie, Pigeon, and Fawn rivers; area, 528 sq. m.; pop. in 1850, 12,725; in 1860, 21,262. The surface is rolling, and the soil is very fertile. The productions in 1850 were 265,011 bushels of wheat, 431,327 of Indian corn, 114,308 of oats, 12,708 tons of hay, and 68,137 lbs. of wool. There were 12 grist mills, 21 saw mills, 4 iron founderies, a woollen factory, 6 distilleries, 2 newspaper offices, 14 churches, and 4,338 pupils attending public schools. The Michigan southern railroad intersects the county. Capital, Cen-

treville. II. A N. co. of Ind., bordering on Michigan, and drained by the St. Joseph's and Kankakee rivers; area, 470 sq. m.; pop. in 1850, 10,954; in 1860, 18,455. The surface is nearly level, and is divided in nearly equal proportions into oak openings, forests, and prairie. The productions in 1850 were 161,956 bushels of wheat, 346,841 of Indian corn, 109,516 of oats, and 31,167 lbs. of wool. There were 6 grist mills, 4 tanneries, 17 churches, and 1,353 pupils attending public schools. Marl and iron ore are found. The Michigan southern and northern Indiana railroad passes through the county. Capital, South Bend.

SAINT JOSEPH, a city of Mo., and capital of Buchanan co., situated on the great E. bend of the Missouri river, 566 m. W. N. W. from St. Louis, and 340 m. from Jefferson City, with both which cities it is connected by lines of steamboats; pop. in 1860, 8,932. It is connected with the Mississippi river by the Hannibal and St. Joseph railroad, and forms one of the chief points of departure for the emigrant trains and the overland mail to Colorado, Utah, Nevada, and California. The town is well built, and has a large female seminary, a convent, a court house, odd fellows' hall, several large hotels, 5 newspapers and periodicals, 8 of them daily, and 10 churches. There are steam flouring and saw mills, bagging manufactories, &c. The trade in fitting out the emigrant trains and expresses is very heavy, amounting in 1858 to \$3,700,000. St. Joseph was chartered as a city in 1857.

SAINT JOSEPH'S, a river of Michigan and Indiana, which rises in Hillsdale co., Mich., and after making a circuit into northern Indiana returns into Michigan, and falls into Lake Michigan, at the village of St. Joseph, after a course of 250 m. Its general direction is nearly W., but its course is serpentine. It is navigable for small steamboats to Constantine, 120 m. from its mouth, where is a good harbor.

SAINT JUST, ANTOINE LOUIS LÉON DE, a French revolutionist, born at Decize, Nivernais, in 1768, died by the guillotine, July 28, 1794. The son of a military man, his education gave him an extravagant admiration of the ancient republics. He early published two licentious but dull poems, *Organt*, in 20 cantos (2 vols. 8vo., 1789), and *Mes passe-temps, ou le nouvel Organt* (1792), and a work entitled *Esprit de la révolution et de la constitution de France* (1791). Through the influence of Robespierre he was returned to the national convention in 1792, though he lacked a year of the legal age. He took the foremost rank among the violent spirits in that body, and in his first speech (Nov. 18) invoked the examples of Rome and England as to the disposition to be made of the king, for whose death without respite or appeal he finally voted. He advocated the concentration of all power in the convention, the supervision of military operations by its members, and the system of terror as the only means of safety for France, declaring that

"those who make half-way revolutions only dig their own graves." After the fall of the Girondists he was made a member of the committee of public safety, and was sent with Le Bas as commissioner to the army of the Rhine, established the guillotine in Alsace, and decimated the population. In Feb. 1794, he was named president of the convention, and in March made the report against Danton and his partisans which insured their death. With Couthon and Robespierre he formed the celebrated triumvirate of the reign of terror. On the 9th Thermidor (July 27) he mounted the tribune to resist the torrent of wrath which was overwhelming them, but in vain; and the next day, with the other terrorists, he was led to the scaffold. Beside the works above mentioned, he was the author of *Fragments sur les institutions républicaines* (12mo., 1800), and of an *Essai de constitution*, printed in his *Œuvres politiques* (8vo., 1833-'4).

SAINT LAMBERT, CHARLES FRANÇOIS, marquis de, a French author, born at Vézelize, Lorraine, in 1717, died in Paris, Feb. 9, 1803. At the court of King Stanislas at Lunéville he met Voltaire, whom he supplanted in the affections of his mistress the marchioness du Châtelet, but was through his influence introduced into the literary and fashionable circles of Paris. He entered the French service as colonel, but after a few years retired from it and devoted himself to literature. In 1756 he formed a connection with Mme. d'Houdetot, the sister-in-law of Mme. d'Épinay, which continued uninterrupted till his death nearly 50 years later. Of his numerous poems the only one now read is *Les saisons* (1769; revised and enlarged ed., 1771). His chief prose work is *Les principes des mœurs chez toutes les nations, ou catéchisme universel* (5 vols. 8vo., 1798-1801).

SAINT LANDRY, a S. W. parish of La., drained by the Atchafalaya, Cortabean, and Teche bayous, and by the affluents of the Mementau river; area, 2,200 sq. m.; pop. in 1860, 23,100, of whom 11,436 were slaves. The surface is high and undulating, and the soil fertile. The staple productions are sugar, cotton, Indian corn, and sweet potatoes. In 1850 there were 6 saw mills, 6 tanneries, 2 newspapers, 6 churches, and 900 pupils in public schools. Capital, Opelousas.

SAINT LAWRENCE, a river of North America, forming for a part of its course the boundary between British America and the United States. It is usually reckoned as issuing from Lake Ontario, in lat. 44° 10' N., and long. 76° 30' W., whence to the sea it is 750 m. long. If the whole length from the head of Lake Superior were reckoned, it would be 1,910 m., or including the St. Louis, the head stream of that lake, 2,100 m. It is navigable for the largest ships to Quebec, and for vessels of 600 tons to Montreal. Above that city its navigation is impeded by rapids, of which the Cedar and Lachine are the most considerable. The inclination of these rapids is so regular,

that steamboats drawing 7 feet of water can descend the river safely; and for the purpose of obviating the difficulty of ascent (Lake Ontario being 234 feet above the ocean level), 7 different canals have been constructed, of an aggregate length of 41 m., which will admit the passage of vessels of 1,000 tons. A canal has also been constructed from Lake Ontario to Lake Erie, called the Welland canal, 28 m. in length, and having capacity to pass a vessel of 500 tons burden. There is also a ship canal of large size around the falls of St. Mary, between Lake Huron and Lake Superior. A vessel of 500 tons may load from the mouth of the St. Louis river at Fond du Lac, or from Chicago, and, without breaking bulk, pass down the St. Lawrence to any port in the world. In 1856, 1,179,246 tons of shipping passed through the Welland canal, and 715,041 tons through the St. Lawrence canals. On leaving Lake Ontario the river is about  $\frac{1}{4}$  of a mile wide, but below Quebec it rapidly expands to 10, 20, and 30 m.; at Cape Gaspé it is 100 m. Its principal tributaries on the N. side are the Ottawa, 680 m. long, the St. Maurice, the Betsiamite or Bersimis, and the Saguenay; those on the S. side, which are smaller and of less importance, are the Oswegatchie, Black, Grass, Racket, St. Regis, Sorel, St. Francis, and Chaudière rivers. The St. Lawrence is studded throughout the greater part of its course with islands; near its egress from Lake Ontario there is a group so numerous as to have received the name of the Thousand islands. The St. Lawrence drains a territory of over 400,000 sq. m., and its basin is computed by Darby to contain "more than half of all the fresh water on this planet." The solid contents of the lakes, river, and gulf, according to his estimate, are 1,547,011,792,360,000 cubic feet of water, or sufficient to envelope the entire earth in a watery covering 3 feet deep.—The gulf of St. Lawrence, which receives the waters of this mighty river, is enclosed by the island of Newfoundland on the E., Nova Scotia, New Brunswick, and Canada on the S. and W., and Labrador on the N. It is usually stated to lie between lat. 46° and 50° N., and long. 58° and 65° W.; but there has been no positive determination of the point where the river ends and the gulf begins, and a commission appointed by the Canadian parliament have within the past two years been engaged in investigations to decide the question. The gulf has 3 channels of communication with the ocean, viz., between Newfoundland and Cape Breton, by the strait of Belle Isle on the N., and through the gut of Canso on the S. It has numerous islands, among which are Anticosti, Prince Edward's, and Magdalen. Its principal bays are Chaleur, between New Brunswick and Canada; Miramichi, in New Brunswick; St. George bay, Nova Scotia; and St. George's, Newfoundland. SAINT LAWRENCE, a N. N. E. co. of New York, bordered N. E. by the St. Lawrence river, and drained by the Indian, Oswegatchie, Grass,

Racket, St. Regis, and Deer rivers and their affluents; area, 2,900 sq. m., being the largest county in the state; pop. in 1860, 90,428. It has 8 lakes of considerable size, Long, Black, and Cranberry, beside several smaller ones. The southern portion of the county is as yet but thinly settled, and is heavily timbered. Along the St. Lawrence, the surface is generally level, and very productive. There are mines of lead and specular iron ore. The productions in 1855 were 320,244 bushels of wheat, 437,041 of oats, 220,593 of Indian corn, 604,023 of potatoes, 139,400 tons of hay, 197,875 lbs. of hops, 4,268,809 of butter, 1,672,999 of cheese, 246,683 of wool, and 513,913 of maple sugar. There were 15 iron manufacturing establishments, 7 woollen factories, 8 asheries, 3 pearlshell manufactories, 7 starch factories, 26 coach and wagon manufactories, 33 grist mills, 138 saw mills, 25 tanneries, 8 newspaper offices, 117 churches, and 437 school houses. Capital, Canton.

**SAINT LEONARDS, EDWARD BURTENSHAW** SEGDEN, baron, an English jurist, born in London in 1781. He studied law at Lincoln's Inn, published in 1805 "A Concise and Practical Treatise of the Law of Vendors and Purchasers" (13th ed., 1857), and was admitted to practice in 1807. In 1808 he published "A Practical Treatise on Powers," and in 1809 "A Series of Letters to a Man of Property, on Sales, Purchases, Mortgages," &c., both which have passed through numerous editions. With slight exceptions, increase of business and official cares prevented his appearing again as an author for 40 years. From 1817 he confined himself to chancery practice, in which he soon took the highest position. He entered parliament in 1828, and in 1829 was made solicitor-general by the duke of Wellington and knighted, retiring from office with Wellington in Nov. 1831. For a brief period in 1835 he was lord chancellor of Ireland under Sir Robert Peel, on whose return to power in 1841 he again received that office, and held it till his retirement in July, 1846. In Feb. 1852, he was appointed lord chancellor of England, and created a peer. He retired with the Derby ministry in December, but continued to take an active part in politics and in the business of the house of lords. In 1849 he published a "Treatise on the Law of Property, as administered in the House of Lords," in 1851 "An Essay on the New Real Property Statutes," and in 1858 "A Handbook on Property Law."

**SAINT LOUIS.** I. An E. co. of Mo., occupying the tongue of land formed by the junction of the Mississippi and Missouri rivers, and drained by the Maramec; area, 550 sq. m.; pop. in 1860, 181,535, of whom 4,352 were slaves. The surface is varied and the soil very fertile. The productions in 1850 were 668,210 bushels of Indian corn, 98,490 of wheat, 138,837 of oats, 14,169 tons of hay, and 203,482 lbs. of butter. There are extensive mines of coal and quarries of marble in the county, and the west-

ern part extends into the great iron region of the state. The Pacific and the St. Charles railroads traverse the county. Capital, St. Louis. II. A N. E. co. of Minn., bounded N. E. by the chain of small lakes which separate that state from British America, S. E. by Lake Superior, and drained by St. Louis, Vermilion, Swan, and other rivers; area, 6,500 sq. m.; pop. in 1860, 406. The county is interspersed with lakes, the most important of which are Namekan, Vermilion, Swan, Sandy, and Crooked lakes. The road from St. Cloud to Fond du Lac passes through the S. E. part of the county. Capital, Oneota.

**SAINT LOUIS,** a city and port of entry of Missouri, and commercial metropolis of the central Mississippi valley, on the right bank of the Mississippi river, 20 m. below the entrance of the Missouri, 174 m. above the mouth of the Ohio, 1,194 m. above New Orleans, and 128 m. E. from Jefferson City; lat. 38° 37' 28" N., long. 90° 15' 16" W.; pop. in 1769, 891; in 1788, 1,197; in 1810, 1,680; in 1820, 4,590; in 1840, 16,467; in 1850, 77,860; and in 1860, 151,780, of whom about 1,500 were slaves. The city is elevated many feet above the floods of the Mississippi, and is protected from them by a limestone bank, instead of the perpendicular cliffs or the alluvial soil which usually form its banks. It is built on two terraces, the first or lower rising somewhat abruptly about 20 feet from the river, the second or upper making a more gradual ascent of 40 feet from the lower, and spreading out into a wide and beautiful plain, commanding a view of the city, the river, and the adjacent country. The corporate limits of the city extend  $6\frac{1}{2}$  m. along the river, which is slightly convex at this point, and between 3 and 4 m. back from it. It contains  $15\frac{1}{2}$  sq. m. The densely settled portion, however, is comprised in a district of about 2 m. along the river, and a little more than a mile in width. The city is regularly laid out, the long streets on the lower terrace running parallel to the curve of the river, while elsewhere they are usually at right angles with those running westward from the river bank. Front or Levee street, along the river, is 100 feet wide, and on its W. side is built up with large warehouses; the other streets are usually 60 feet in width. The city is remarkably well built, most of its warehouses and a large proportion of its public edifices and dwellings being of brick or stone. Nearly 2,800 buildings were erected in the city in 1860, at a cost of about \$7,500,000. The principal public buildings are: the city hall; the court house, erected at an expense of \$500,000; the new custom house and post office, costing \$350,000; the United States arsenal, a large and imposing structure in the S. E. part of the city, surrounded with fine grounds; the merchants' exchange, the mercantile library hall, the city hospital, the marine hospital, the high school building, St. Louis university, several magnificent hotels, the cathedral (136 feet long and 84 wide, with a front of polished free stone), St. George's

(Episcopal) church, and the church of the Messiah (Unitarian). There are in the city 76 churches, of which 8 are Baptist, 7 Episcopal, 8 Lutheran and Evangelical, 18 Methodist, 12 Presbyterian, 19 Roman Catholic, and 1 each Congregational, Jewish, Unitarian, and Universalist.—The benevolent and charitable institutions of St. Louis are very numerous; it has 10 orphan asylums, a home for the friendless, a house of refuge with 125 inmates, a girls' industrial home, an industrial school for boys, several free evening schools, an insane hospital, a maternity and infant hospital, a marine hospital (a fine edifice of great capacity), and 3 general hospitals; 7 convents, and numerous benevolent and benefit societies. The schools of St. Louis have for many years enjoyed a high reputation. They include a normal school, a high school occupying a fine and well planned edifice, and 26 public schools of lower grade. The amount of the school tax for 1860 was \$78,463, in addition to the receipts of the school fund and other funds, which were large. Beside these, 35 schools, academies, and seminaries are not connected with the board of education. The St. Louis university, under the direction of members of the society of Jesus, was founded in 1829, and incorporated in 1832. It has a very valuable museum, a complete set of philosophical and chemical apparatus, and libraries containing about 22,000 volumes; and in 1860 there were 18 professors and instructors and 134 students. The Washington university, incorporated in 1853, is an institution intended to embrace the whole range of university studies, except theological, and to afford opportunity of complete preparation for every sphere of practical and scientific life. Three departments are already organized and in operation, the academic, the scientific, and the practical or industrial; and others will be established as occasion may require. The O'Fallon polytechnic institute is one of the departments of this university; it has a library of several thousand volumes, and a well supplied reading room, and is organizing a corps of instructors in the different topics embraced in technological science. There are also a commercial college of some note, and 3 medical colleges, one of them homœopathic. The academy of science, founded in 1856, has a large museum and a good library, and has published its transactions and is in correspondence with other similar institutions. A German institute of science, art, and mechanics was founded in 1856. Beside the libraries of the colleges, &c., there are 3 public libraries, the new library, the mercantile library, with 22,000 volumes, and the library of the Franklin association. In 1860 there were 53 periodicals and newspapers published in the city, of which 11 were dailies (issuing also weekly editions, 3 were published tri-weekly, 24 weekly, 4 semi-monthly, 9 monthly, and 2 quarterly; 9 were printed in the German and one in the French language. St. Louis has 5 theatres and an opera house, and 10 fine hotels,

of which the largest and best are the Lindell house, an immense and costly structure; the Planters' hotel, occupying the entire front on Fourth street between Pine and Chestnut; the city hotel, the United States, the southern (not completed), the Virginia, the Missouri, the Everett, and the Monroe houses. At the beginning of 1860 there were 5 lines of city railroads in operation. There are 16 cemeteries in and around the city, several of them from 5 to 8 miles distant. The city is supplied with water from a large reservoir, into which it is pumped by stationary engines from the river, and distributed through the streets in iron pipes. The enlargement of the supply has been for some time in contemplation. Gas has been used for lighting the city since 1848. There are several parks, the largest of which, called the fair grounds, comprises about 50 acres. The levee along the river bank has been greatly improved at a very heavy expense within a few years, and now affords facilities for steamboats to discharge their cargoes superior to those of any other city on the Mississippi.—St. Louis is largely engaged in manufacturing. Her flouring mills, of which there are 19, have a very high reputation; their production increased from 408,099 barrels in 1851 to 873,546 in 1859. The sugar received in St. Louis in 1859 was 53,174 hhd., 9,186 bbl., and 6,695 boxes, and the molasses 56,624 barrels and 15,981 kegs, being an amount equal to that exported to all other ports from New Orleans. The greater part of this was for the supply of the large sugar refineries of the city, which manufacture most of the sugar consumed in the Mississippi valley. The fur trade of St. Louis in 1860 amounted to \$549,422. \$340,000 being for buffalo robes, of which 85,000 were brought into market. There were also 125,000 raccoon skins, 37,000 mink skins, 120,000 lbs. of deer skins, 10,800 wolf skins, 34,500 opossum skins, and from 1,000 to 5,500 each of otter, fox, muskrat, wild cat, beaver, polecat, and other skins. Oils and chemicals are extensively manufactured. Lard and linseed oils form an important item in the productions of the city; in 1852 the amount of the former was nearly 5,000 bbl., and in 1860 it was 30,000 bbl. The production of linseed oil for a few years past has diminished, from a short supply of flax seed, but St. Louis is still one of the principal points of its manufacture. The manufacture of hemp into bale rope and bagging, the distilling of whiskey, and the manufacture of tobacco, in which 10 or 12 establishments are employed, all occupy many hands and a large amount of capital. The packing of pork, beef, lard, and hams employs a very large capital. Many of the leading provision dealers of the eastern cities have their packing houses here. The number of hogs slaughtered in 1860 was 78,000, and the pork shipped, including receipts from packing points above St. Louis, was 100,000 bbl., 18,000 casks and hhd., and 700,000 pieces; lard, 71,000 bbl.; beef,

8,000 bbls. But the manufacture of iron surpasses all others in its extent, and the amount of capital involved. The vast products of Pilot Knob and Iron Mountain are brought here for smelting, and for the manufacture of stoves, hollow ware, and other castings, railing, machinery, locomotives, and stationary boilers. The amount of pig iron received in 1858 was 17,565 tons; in 1859, 16,250 tons; in 1860, 19,700 tons. There is also annually manufactured about 50,000 tons brought from other points. In 1850, since which the population has more than doubled, there were upward of 1,300 manufacturing establishments of all kinds in operation, employing a capital of over \$15,000,000. St. Louis is an important entrepot of trade, not only with Missouri and the adjacent states, but with the gold region of Colorado, with Utah, Nevada, and California. The navigation of the Mississippi and the Missouri, with that of their numerous affluents, brings to it an immense traffic. The St. Louis and Iron Mountain railroad, 87 m. long, connects it with the iron region; the Pacific railway, destined to extend across the Rocky mountains, has now 189 m. of its course completed, to Sedalia, 64 m. beyond Jefferson City, while a branch extends to Rolla, 76 m. from Franklin; and toward the N. W. the city is connected with St. Joseph on the Missouri by 304 m. of railroad, and a branch extends thence 15 m. further toward the Iowa line. Eastward, St. Louis is connected by railway with the great network of lines which traverse Illinois, and extend their ramifications into every state E. of the Mississippi river. Continuous lines connect it with New Orleans, with Nashville, Charleston, Richmond, Baltimore, Philadelphia, New York, and Boston. By 4 lines of telegraph it is in magnetic communication with all points E. and S., and with the N. W. and the W. as far as the interior of Kansas, and will soon be with the gold region of Colorado, if not with the cities of the Pacific coast. The shipping owned, enrolled, and licensed at the port amounted in 1854 to 48,575 tons, and in 1860 to 64,683 tons. The arrivals of steamboats in 1860 were 4,371, tonnage 1,120,039. The following table shows the amount of the principal articles brought into the city in the years 1857-'9:

Articles.	1857.	1858.	1859.
Brooms, dozen.....	20,642	19,248	25,175
Beans, sacks or barrels.....	7,114	19,714	47,184
Bacon, casks.....	11,018	16,272	56,751
" tierces.....	707	746	839
" barrels.....	1,024	3,411	3,209
" boxes.....	1,140	849	623
" packages.....	795	11,435	1,560
" pieces.....	8,549	86,717	14,351
Barley, sacks.....	88,081	145,828	115,935
Butter, packages.....	6,070	15,979	27,699
Corn, bushels.....	2,485,786	859,946	1,605,625
Cotton yarn, bales.....	12,779	7,830	9,551
Coffee, sacks.....	109,061	140,165	148,383
Cheese, boxes.....		11,908	37,819
Flour, barrels.....	805,061	518,512	358,671
Flax seed, bushels.....	4,862	11,809	5,214
Dried fruit, bushels.....	28,465	78,091	80,064
Hemp, bales.....	78,967	51,126	63,973

Articles.	1857.	1858.	1859.
Hides, pieces.....	128,804	200,406	216,396
" bundles.....	8,082	4,003	9,039
Hay, bales.....	24,896	35,656	58,178
Lead, pigs.....	162,555	805,587	263,694
Lard, tierces.....	27,491	28,967	29,724
" barrels.....	27,583	31,481	15,698
" kegs.....	9,831	15,114	9,024
" packages.....	6,164	2,685	3,823
Molasses, barrels.....	46,704	40,636	56,624
" kegs.....	4,126	2,435	15,951
" hhds.....	10,015	2,308	....
Malt, sacks.....	23,248	22,216	9,880
Nails, kegs.....	173,685	110,301	204,767
Oats, sacks.....	608,943	845,014	682,437
Onions, bushels.....	145,523	1,27,740	61,960
Pork, barrels.....	103,101	127,216	102,653
" tierces.....	8,206	5,665	5,360
" boxes.....	495	229	717
" pieces.....	492,547	588,921	601,734
" tons.....	1,463	765	618
Pigs, ear loads.....	...	1,108	845
" head.....	...	...	3,089
Potatoes, bushels.....	314,961	453,359	480,373
Pig iron, tons.....	22,914	17,063	16,250
Rye, sacks.....	15,221	24,950	92,685
Rice, tierces.....	5,522	55,500	9,085
Sugar, hhds.....	81,141	53,891	53,174
" bbls.....	5,503	8,493	9,150
" boxes.....	8,828	17,374	6,695
Salt, bushels.....	743,335	1,035,370	780,557
Tobacco, hhds.....	1,107	8,706	11,976
" packages.....	12,111	9,560	15,387
Wheat, bushels.....	2,384,443	3,608,163	3,873,248
Wool, bags.....	2,935	8,678	4,937
Whiskey, barrels.....	125,547	110,772	98,588

—On Jan. 1, 1861, there were 7 banks, having an aggregate capital of \$9,559,602, and holding \$5,021,049 of exchange and \$469,999 of specie; their circulation was \$300,520. The country branches of these banks held \$4,909,210 of exchange, \$2,575,077 in coin, and had a circulation of \$6,377,965. The number of savings institutions is 12, the capital of 8 of which is \$2,640,000. There are 24 fire and marine insurance companies, 9 of them on the mutual plan, though 5 of these have guaranty capitals; the nominal capital of the stock companies is about \$6,000,000; and 8 life insurance companies, all on the mutual system. A chamber of commerce was organized in 1843, and a mechanics' and manufacturers' exchange, intended for the encouragement and promotion of the mechanical and manufacturing interests of the city.—The city government consists of a mayor and a common council of 20 members. The police is metropolitan, and the governor of the state is its legal head. It consists of a board of commissioners, of which the mayor is a member, a chief, a city marshal, 3 deputies, 2 captains, 4 assistant captains, 10 sergeants, and 175 patrolmen. The city has a paid fire department, provided with steam fire engines. The city debt, in Oct. 1860, was \$5,016,700, a decrease of \$490,000 in 2½ years. The valuation of real and personal property in 1860 was \$102,408,230; the tax levied was \$1,106,498, and the entire revenue \$1,453,356.—In 1762 M. d'Abbadie, the director-general of Louisiana, granted to a company of merchants, of whom Pierre Ligneste Laclede was the leader, the exclusive right of trade with the Indians on the Missouri. This company after careful examination established themselves on the present site of St. Louis, Feb. 15, 1764, and erected a large

house and 4 stores there. In 1770 the number of settlers had increased to 40 families, and a small garrison was maintained there. Two years previous to this time (Aug. 11, 1768), a company of Spanish troops under Capt. Rions took possession of it, in the name of the king of Spain, under whose sway it remained till its transfer to the United States in 1804. In 1780 it was threatened, in common with the other settlements on the Mississippi, Illinois, and Washash rivers, with destruction by a British force, which descended Lake Michigan, but was saved by the energy of Gen. George Rogers Clark. For many years it was only a trading post for the fur traders, and the furs collected there reached an annual value of about \$200,000 at the beginning of the century. The first brick house was erected in 1813; in 1817 the first steamboat arrived there. In 1822 St. Louis was chartered as a city, though still having hardly 5,000 inhabitants. The growth of Illinois, which began to be rapid after 1825, gave St. Louis its first great impulse; and the ascent of steamers to the Great falls soon created a thriving trade, which, growing slowly at first, began to assume magnificent proportions in 1840, and is now unsurpassed by any western city.

SAINT LUCIA, one of the Windward group of the British West India islands, about 30 m. S. of Martinique; lat. of N. point 14° 5' N., long. 60° 57' W.; area, 270 sq. m.; pop. in 1857, 25,307. The island is divided into 4 districts; the chief town is Castries, situated on low ground at the head of a long winding bay surrounded by hills. St. Lucia is of volcanic origin, and some of the mountains have extinct craters at their summits. Severe earthquakes have occasionally been felt. The climate is unhealthy. Sugar cane is the chief crop raised, and the plant continues to yield luxuriantly for 5 or 6 years, and does not require annual planting as elsewhere. The revenue of the island in 1854 was £14,098, and the expenditure was £13,565, exclusive of £12,706 defrayed by England for military expenses.—St. Lucia was first settled by the English in 1639, but the colonists were expelled by the natives. About 20 years afterward the French established themselves, and between that time and 1804 it was taken and retaken by the English and French 11 times. Since 1804 it has remained in possession of the British; but the laws, except some slight alterations made by the colonial council, are the same as those of France before the *Code Napoléon* was introduced. The produce is greater at present than it was when slavery existed on the island.

SAINT LUCIE (now BREVARD), a S. E. co. of Florida, bordering on the Atlantic; area, about 8,100 sq. m.; pop. in 1860, 246. The surface is flat and marshy, and much of it occupied by the Everglades and small lakes. It is intersected by Kissimmee river. Lake Okechobee, about 80 m. in diameter, is in the S. part. There are extensive pine forests. Capital, Susannah.

SAINT MALO, a fortified town of France, capital of the department of Ille-et-Vilaine, situated on the rocky peninsula of Aron, near the mouth of the Rance in the bay of St. Malo, 40 m. N. N. W. from Rennes; pop. in 1856, 9,744. The town is connected with the mainland by a long, fine causeway called the Sillon. The harbor is large and safe, but difficult of access, being encumbered by shoals at its entrance, and the tide has a greater ebb and flow there than in any other European port, rising sometimes to the height of 45 feet, while at low water the port is dry. The town is largely engaged in fisheries, sending many vessels to the coast of Newfoundland for cod. St. Malo is the birthplace of Maupertuis, Jacques Cartier, La Bourdonnais, Broussais, Châteaubriand, and Lamennais. The tomb of Châteaubriand, surmounted by a granite cross, on a rock in the harbor, is visible from a distance. The town was founded in the 8th century, and received its name from Maclou, its first bishop. It has been 3 times bombarded by the English. The first French East India company was founded here.

SAINT MARC GIRARDIN. See GIRARDIN.

SAINT MARTIN, one of the West India islands, belonging to the Leeward group of the Caribbees, between Anguilla and St. Bartholomew; area about 80 sq. m.; pop. in 1849, 7,773. The N. part, nearly  $\frac{3}{4}$  of the whole, belongs to the French, and the S. to the Dutch. The French portion in 1849 had 3,773 inhabitants, of whom about 3,000 were then slaves; and in 1858 the Dutch portion had 2,986 inhabitants. The surface of the island is hilly, the climate healthy, and the soil not very fertile. Sugar and rum are the principal products of the French part, of which only about  $\frac{1}{4}$  is cultivated. The Dutch portion is less fertile, but mostly under culture, and exports sugar, rum, and salt, obtained from lagoons along the shore. The island was settled by the French and Dutch in 1638. The Spaniards expelled them, but abandoned it in 1650, when the original owners again took possession and divided it between them. Capital of the French part, Le Marigot; of the Dutch, Philipsburg.

SAINT MARTIN, JEAN ANTOINE, a French oriental scholar, born in Paris, Jan. 17, 1791, died there, July 20, 1832. He was the son of a tailor, and studied oriental literature under Sylvestre de Sacy. After the restoration of the Bourbons he received a number of valuable sinecure offices, of which he was deprived after 1830, chiefly on account of the zeal with which he had conducted in conjunction with Abel Rémusat the absolutist newspaper, *L'universel*. He died in great poverty. His principal works are: *Mémoires historiques et géographiques sur l'Arménie* (2 vols., Paris, 1818-'22); *Nouvelles recherches sur l'époque de la mort d'Alexandre* (1820); and an enlarged edition of Le Beau's *Histoire du bas empire* (21 vols., 1824).

**SAINT MARTIN**, **LOUIS CLAUDE DE**, called by himself *le philosophe inconnu*, a French metaphysician, born in Amboise, Jan. 18, 1743, died in Annay, near Paris, Oct. 13, 1803. At the age of 22 he entered the French army, and while in garrison at Bordeaux became interested in the doctrines of Martinez Pasqualis, founder of the theosophical sect of the Martinists, which he afterward rejected for those of Swedenborg. Subsequently he entered with enthusiasm upon the study of the writings of Jacob Boehm. He left the army about 1780, and for several years was engaged in literary labors in Paris or in foreign travel. During the revolution he remained in France, although exposed to danger, and in 1794 was appointed professor in the normal schools of Amboise. The latter years of his life were devoted to literature. His principal works are: *Des erreurs et de la vérité* (Lyons, 1775), directed against the sceptical philosophy of the encyclopædists; *Tableau naturel des rapports qui existent entre Dieu, l'homme et l'univers* (Lyons, 1782), in which he endeavors to prove that we must explain things by man and not man by things; *L'homme de désir* (1790); *Ecce Homo* (1792); *Le nouvel homme* (1796); *De l'esprit des choses* (1800); and *Le ministère de l'homme-esprit* (1802). He also wrote *Le crocodile*, a mystical poem, interspersed with prose, and translated into French the "Three Principles" and "Aurora" of Boehm.

**SAINT MARTIN'S**, a S. parish of La., bordered S. W. by Grand or Chetimaches lake, E. in part by Grand river, and intersected by Atchafalaya and Teche bayous; area, 750 sq. m.; pop. in 1860, 12,677, of whom 7,359 were slaves. The surface is level, and the soil productive. The productions in 1850 were 4,188 hhd. of sugar, 237,160 galls. of molasses, 4,073 bales of cotton, and 517,401 bushels of Indian corn. The bayous are navigated by large steamers. Capital, St. Martinsville.

**SAINT MARY'S**, a S. co. of Md., bounded N. E. by the Patuxent, E. by Chesapeake bay, and S. W. by the Potomac; area, about 250 sq. m.; pop. in 1860, 15,214, of whom 6,549 were slaves. Nearly every portion of the county is within a few miles of tide water, owing to the numerous bays and creeks by which it is indented. The surface is nearly level and the soil tolerably fertile. The productions in 1850 were 378,461 bushels of Indian corn, 156,869 of wheat, and 71,950 lbs. of butter. The county was settled about 1634. Capital, Leonardtown.

**SAINT MARY'S**, a S. parish of La., bordered S. W. by several bays of the gulf of Mexico, and N. E. by Lake Chetimaches, and drained by Atchafalaya and Teche bayous; area, 860 sq. m.; pop. in 1860, 16,812, of whom 13,057 were slaves. The surface is flat and marshy, and the soil highly fertile. The productions in 1850 were 24,765 hhd. of sugar (a larger quantity than any other county in the United States), 897,660 galls. of molasses, and 305,290 bushels of Indian corn. Capital, Franklin.

**SAINT MARY'S STRAIT**, the connecting link between Lake Superior and Lake Huron, forming also the boundary between Canada West and the upper peninsula of Michigan. Commencing at the head of Tequamenon bay, a frith of Lake Superior, the strait holds a general S. E. course of 63 m. to the head of Drummond island, in Lake Huron. One mile below Lake Superior are the rapids known as St. Mary's falls or Sault de Ste. Marie, and below these the strait spreads out into a broad lake, enclosing large and beautiful islands, and having three distinct channels, and again contracts into a narrow and rapid stream. It is navigable up to the rapids for the largest vessels. These rapids have within the space of  $\frac{1}{4}$  of a mile a fall of 22 feet, and constitute a point of great attraction for visitors, who often descend the rapids in a birch canoe, under the guidance of an Indian *voyageur*. A ship canal around the falls was completed May 19, 1855. It is 100 feet wide and 12 feet deep, admitting the largest lake steamers; the locks are of solid masonry, 25 feet high and 10 feet thick at the base, with buttresses 6 feet wide, at distances of 12 feet apart. The greater part of the canal is cut through solid rock.

**SAINT MICHAEL** (Port. *Sao Miguel*), the largest of the Azore islands, in the Atlantic ocean, lat. 37° 48' N., long. 25° 30' W., 36 m. long from E. to W.; area, 224 sq. m.; pop. 80,809. The surface is mountainous and hilly, the Agoa do Pão, its culminating point, being 3,066 feet in height. It is volcanic and subject to earthquakes, and has several lakes and numerous mineral springs. The soil is fertile. Oranges to the value of \$200,000 annually are exported; the other products are maize, wheat, beans, and wine. Chief town, Ponta Delgada. The island was discovered and claimed for Portugal by Gonzales Velho de Cabral, in 1444.

**SAINT OMER**, a town of France, in the department of Pas-de-Calais, on the Aa, at the mouth of the canal of Neuf Fossé, 23 m. S. E. from Calais; pop. in 1856, 19,193. It is a fortress of the first class, and is surrounded by a rampart and outworks; but the principal defence is the facility with which the marshes around it can be inundated. Woollen cloths, thread, starch, glue, oil, clay pipes, fishing nets, salt, leather, paper, beer, and brandy are manufactured. The Catholic theological seminary here is celebrated.

**SAINT PAUL**, a city, port of entry, and the capital of Ramsey co., and of the state of Minnesota, on the left bank of the Mississippi river, 2,082 m. from its mouth, and 9 m. below the falls of St. Anthony; lat. 44° 52' 46" N., long. 93° 5' W.; pop. in 1850, 1,112; in 1860, 10,277. The site of the town is on a plain about 80 feet above the river and 800 feet above the gulf of Mexico, and partially encircled by low hills, which abound in springs of excellent water. The river is navigable to this point for large steamers. In 1846 it contained 10 white inhabitants, and in the spring of 1847 it



had only 3 families. It has now 14 churches, about the same number of hotels, a fine state house, and an extensive public market. In 1849 the entire business of the town amounted to \$181,000; in 1854 it was \$5,868,500; in 1859, a year of great depression, it was \$3,181,240. In 1860 the manufactures of the city amounted to \$607,198, including lumber, flour, &c. The furs exported from St. Paul in 1859 amounted to \$161,022. The number of steamboat arrivals at the present site of St. Paul in 1844 was 41; in 1850, 194; in 1855, 560; in 1858, 1,068; in 1860, 776. In 1849 there were 2 boats engaged in the navigation, measuring 240 tons; in 1858, 62, measuring 12,703 tons; in 1860, 46 boats, measuring 10,020 tons. In 1847 the first English school in the town or territory was established by the national board of popular education. In 1852 there were 2 schools and 205 pupils; in 1860 there were 3 public schools in the city, with 1,324 scholars. Beside these there are the St. Paul college and the Baldwin female seminary, both endowed, St. Joseph's female academy, taught by sisters of charity, and the St. Paul female seminary. The value of real and personal estate in the city in 1855 was \$2,380,467; in 1859, \$5,771,201.

**SAINT PAUL DE LOANDA**, a city and the seat of government of the Portuguese possessions in lower Guinea, W. Africa, situated a few miles S. of the mouth of the river Benga, in lat.  $8^{\circ} 48' 1''$  S., long.  $13^{\circ} 13'$  E.; pop. in 1851, 830 whites, 2,400 half-breeds, and 9,000 blacks. It was once a considerable city, but is now in decay. It contains the ruins of two cathedrals, one of which was used as a college by the Jesuits in the 17th century, several commodious government buildings, and a few handsome stone houses. The harbor, formed by a low sandy island, is protected by 3 forts.

**SAINT PETERSBURG**, a government of Russia, bounded N. by the gulf of Finland, the government of Vyborg, and Lake Ladoga, N. E. by the government of Olonetz, E. by Novgorod, S. by Pskov, and W. by Lake Peipus and Esthonia; area, 16,533 sq. m.; pop. in 1856, 1,080,398. It is drained by the Neva, Luga, and Narva, which discharge their waters into the gulf of Finland, and the Volkhov, Svir, and other streams, which have their mouths in Lake Ladoga. The surface is mostly low and flat, and much of it covered with swamps, but there are some low hills in the N. E., and a spur of the Valdai mountains enters it on the S. The climate is severe, and the soil not productive. There are extensive forests. The manufactures, particularly in the city of St. Petersburg, are very valuable and of great extent. It was a part of ancient Ingria, and was the principal theatre of the long wars between the Swedes and the Russians, in which it suffered severely. Peter the Great finally conquered it, and it was secured to Russia by the peace of Nystad in 1721. Capital, St. Petersburg.

**SAINT PETERSBURG**, the capital of Russia, situated on and around the delta of the Neva, in lat.  $59^{\circ} 56' 30''$  N., long.  $30^{\circ} 19'$  E., 16 m. E. from its port of Cronstadt, and 400 m. N. W. from Moscow; pop. in 1857, 494,656. The site is one of the most extraordinary ever selected for a great city, near the arctic circle, on a river navigable only for vessels of small draught, in a flat, marshy, malarious region, and where the foundations of every building have to be made on piles, and sometimes on successive tiers of them; yet, through the energy and perseverance of the Russian monarchs, it has within a century and a half attained a rank among cities of the first class of Europe. The Neva, as it approaches the gulf of Finland, turns first N. and then W., and soon divides into the Great and Little Neva, and the Great and Little Neva. Beginning at the north, the first two enclose the Elaginskoi, Kamennoi, and Krestofskoi islands; between the Great Neva and the Neva lies the large Aptekarskoi island; Citadel island is in the Neva; Petrofskoi island lies between the Little Neva and the Little Neva, as do several smaller islands; while south of the Little Neva and between it and the Great Neva are Goloday and Vasiliefskoi islands, the latter the largest and most valuable of the delta. S. E. of this and lying in the peninsula (made into a series of islands by canals) formed by the bend of the Neva lies the peninsular or admiralty quarter of the city. All these islands are included within the limits of the city, and the larger are very populous. They are connected with the peninsula and with each other by 10 bridges, several of them very costly and beautiful. Beyond the Neva at the E. there is a large and rapidly growing suburb. The Neva, though broad and clear, is a shallow stream, and a bar at its mouth forbids the passage of vessels drawing more than 9 feet of water; and though the hulls of large ships are built at the city dockyards, they are of necessity floated to the great harbor of Cronstadt for their masts, rigging, and cargoes or armament. The city is not liable to an attack by sea, but it has no adequate defences against an approach by land.—The citizens divide the city into two sections. That on the peninsula, S. of the Neva, containing the finest buildings and the widest and best streets, is called the Bolshaya Storona or Great side; while the islands and the settlements on the N. bank of the Neva are collectively called the Petersburg side. On the latter side, opposite the so called English quay, is the exchange; there too are most of the important docks and commercial warehouses. The whole city is perfectly flat and level, and elevated but little above the ordinary height of the Neva, which has more than once overflowed it and caused great destruction of life and property. The peninsula, or Great side, is drained by a number of canals, the principal of which are the Moika, the Catharina, the Fontanka, and the Zagorodnoi, connected with

each other and with the Neva by cross canals. The banks of the principal canals are protected by walls of hewn granite, and crossed by numerous fine bridges; they are navigable for boats of considerable size. The quays along the Neva are of great extent and solidity, surpassing in this respect those of any other city of Europe. The admiralty building, situated on the S. side of the Neva, is an immense and massive pile with a dome and spire visible even at Cronstadt, and is the central point of the S. or Great side. The statue of Peter the Great is on its S. W. side, and the column of Alexander I. on the N. E. From the galleries of this building the whole city can be seen. Radiating from it to the S. E., S. S. E., and S. are the 3 finest streets of the city, viz.: the Nevskoi Prospekt or Neva perspective, the Gorokhovaya Ulitsa or Peas street, and the Voskresenskoi Prospekt or Resurrection perspective. The Neva perspective is 130 feet broad and about 4 m. long. The streets of St. Petersburg are generally broad, as compared with those of most European cities, but this street is perhaps in every respect the finest in Europe. The buildings are erected on large plots, so that there are not more than 50 in a mile's distance. It contains the celebrated cathedral of Our Lady of Kasan, a costly and sumptuous edifice, liberally adorned with silver, gold, and gems, but possessing very little architectural merit, and another Greek church, both with their blue domes decorated with stars; a Dutch church, a Protestant German church, a Catholic and an Armenian church, all costly and some of them very beautiful. Here too are the *hôtel de l'état major* or military head-quarters, the palace of the archduke Michael, the great bazaar with its 10,000 merchants, the institution of St. Catharine, and a theatre. At the end of this street and near the city limits are the convent and church of St. Alexander Nevskoi, the latter containing a sarcophagus of pure silver in which the body of the saint is preserved, and the palace of the metropolitan. The church of St. Peter and St. Paul in the citadel, whose tall, slender, richly gilt spire, 208 feet in height, can be seen from all parts of the city or its suburbs, contains the remains of all the Russian monarchs since Peter the Great. The Isaac church, S. W. of the admiralty, in one of the largest open spaces of the capital, is celebrated for its simple but grand architecture, its noble proportions, and its imposing porches. Like the Greek churches generally, it is in the form of a Greek cross, and has 4 grand entrances, each approached by 3 broad flights of steps, and each entire flight composed of a single piece of granite. Each entrance has a superb peristyle composed of monolithic columns of polished granite, each 60 feet in height and 7 feet in diameter, and the whole surmounted by a cupola 120 feet above the peristyles, covered with copper and richly gilt, and resting on 30 granite pillars. The foundation

of this church, formed of several successive tiers of piles, is said to have cost some \$4,000,000. The church of the Smolnoi convent, in the N. E. of the peninsula, is built of white marble, and is surmounted by 5 blue domes spangled with golden stars. The Preobrazhenskaya church belongs to one of the oldest regiments of the guards, and is profusely decorated within and without with military trophies. The church of the English factory, W. of the admiralty, is a fine edifice and richly ornamented.—St. Petersburg is a city of palaces. The Winter palace is said when the emperor occupies it to have more than 6,000 inhabitants. It is the largest palace in the world, and is in the form of a vast square, somewhat more than 700 feet in length. Its halls are of wonderful beauty, and filled with the richest statuary, gems, and pictures. Here are to be found some of the most magnificent tables and vases of malachite, the production of which is reserved for the emperor. The Hermitage, built by Catharine II., is connected by several galleries with the Winter palace. It possesses little architectural merit, but has a valuable gallery of paintings. The marble palace, a massive, gloomy-looking building, lies near Troitzkoi or Trinity bridge, considerably E. of the Hermitage. A mile further E., on the banks of the Neva, stands the Taurida palace, which has a ball room 320 feet long and 70 wide. The Annichkoff palace, the favorite residence of the emperor Nicholas, is on the Great perspective near the Fontanka canal. The new Mihailoff palace is the residence of the grand duke Constantine, and is regarded as the most elegant building in St. Petersburg. The government buildings are remarkable for their immense size, and some of them possess great architectural beauty. The principal are the admiralty, half a mile long and with two wings 650 feet in length, the holy synod, the headquarters of the ecclesiastical direction of the Greek church, the *hôtel de l'état major*, and the war office; and on the opposite side of the Neva, on Vasiliefskoi island, the exchange and custom house, both imposing edifices; on Citadel island, the citadel and the mint; and further down the Neva, on Vasiliefskoi island again, the *hôtel des mines*, the academy of arts, the academy of sciences with its museum and observatory, and the fine barracks of the cadets. On the Little Neva is the Russian academy, and on Aptekarskoi island the government botanical garden, while beyond the Nefka, in the Viborg quarter, is a fine naval hospital.—The imperial library of St. Petersburg ranks among the great libraries of Europe. It contains 450,000 printed volumes and over 25,000 manuscripts, many of them of great value. A considerable portion of this library is derived from the spoils of Poland. It is richer in oriental manuscripts than any other in Europe, with the possible exception of that of the Vatican. The academy of sciences has also a library of 110,000 volumes; the Hermitage has 120,000 volumes,

of which 10,000 are Russian; and the Alexander Nevskoi monastery has a small library (10,000 volumes), the manuscripts of which are extremely valuable and rare. The academy of sciences has a vast and very complete museum, Asiatic, Egyptian, ethnological, numismatic, mineralogical, botanical, and zoological. The academy of fine arts has a large and well selected collection of pictures in its gallery; but the finest gallery of paintings, as well as the most admirable collection of objects of *virtu*, is that at the Hermitage, which occupies 43 rooms, 41 of them containing paintings. The Rumiantzoff museum, bequeathed to the nation by Count Rumiantzoff, is an excellent collection of oriental objects; and the museum connected with the school of mines has a mineralogical and geological cabinet said to be unsurpassed in the world.—The university of St. Petersburg stands at the head of the educational institutions of the city. It was founded in 1819, and has faculties of philosophy, law, medicine, mathematics, history, and philology. In 1851 it had 68 professors and teachers and 369 students. There are also 5 colleges and numerous special scientific schools, and public schools of all grades. The benevolent institutions of St. Petersburg are on a grand scale. Its founding hospital, founded by Catharine II. in 1772, now occupies 28 acres, with its buildings, courts, and gardens, in the best part of the city. (See *FOUNDLING HOSPITAL*.) The Obonkoff hospital has 2,000 beds, and the military hospital about the same number. There are also two maternity hospitals, a hospital for poor workmen, two orphan asylums, and an insane hospital of great extent.—The mean annual temperature of St. Petersburg is 39° F.; the mean summer temperature is 62°, that of winter 14°. The extremes are 99° and —51°. The cold is very severe, but, protected in their warm and abundant furs, the residents do not feel it so much as in milder climates.—The manufactures of St. Petersburg are very extensive and valuable. The imperial manufactures of Gobelins tapestry, of glass, of porcelain, and of articles of malachite and other precious stones, of military surgical instruments, and of embroideries, are on a large scale, and conducted by workmen of the highest skill. There are also extensive foundries of cannon, and factories for the manufacture of cotton, silk, muslin, and woollen goods, leather, fringes, paper, tobacco, soap, clocks, jewelry, &c. The commerce of the city is very large, though a portion of it is brought by lighters to and from Cronstadt. In 1855 there were 87 steamships plying to foreign ports. The average annual exports from 1851 to 1856 were \$27,000,000, and the imports \$47,000,000.—St. Petersburg was founded May 27, 1703, by Peter the Great. He first erected a fortress on the site of the present citadel; and such were the obstacles with which he met in the treacherous character of the soil, the climate, and the insalubrity of the loca-

tion, that a man of less resolute will would have abandoned the undertaking. But his perseverance triumphed over all difficulties, and in 1712 he declared it his capital, Moscow having been the previous capital of the empire. At his death, however, the city was still a miserable collection of hovels, with a few good buildings. His successors embellished and almost created it. Catharine II. in particular constructed the massive canals, which by draining it rendered it far more salubrious, and increased its palaces, its costly dwellings, its churches, and its public edifices; and Alexander I. and Nicholas added materially to what she had begun. In 1824 it was visited with a terrible inundation, by which hundreds lost their lives and thousands their entire property. A similar disaster threatens the city at the breaking up of the ice in the Neva every season. In 1837 the great Winter palace, all of whose rooms and labyrinths were not known to any one living, was burned to the ground; but few lives were lost. It was rebuilt with greater splendor and on a better plan in two years from that time. The city is the residence of a great number of foreigners; all the ministers and *chargés* from foreign courts to the Russian government are obliged to reside there. Though never regarded as a healthy city, its salubrity has much improved within a few years past.

SAINT PIERRE, a fortified town and the capital of the island of Martinique, situated on the N. W. coast; pop. 25,000. It is the largest town in the French West Indies, and is well built, on a narrow strip of land lying along the beach of a semi-circular bay, and overhung by the steep cliffs which approach the shore. There is an old Catholic college and a fine botanic garden. There are few manufactures, but a prosperous trade. The harbor has a good anchorage ground, which however is much exposed. The empress Josephine was born here.

SAINT PIERRE AND MIQUELON, a French colony, comprising the islands of St. Pierre and Great and Little Miquelon, off the S. coast of Newfoundland, and opposite the gulf of St. Lawrence; area, 106 sq. m.; permanent pop. about 2,000. It is of great importance to France as a fishing rendezvous. Its exports in 1859 were: codfish, 5,322,706 francs; codfish oil, 1,858,037; whale oil, 371,228; total, 7,749,033 francs, official value, but the actual value was 15,504,027 francs. The imports were 7,782,615 francs, actual value. Capital, St. Pierre; pop. 800. (See *FISHERIES*, vol. vii. p. 527.)

SAINT PIERRE, CHARLES IRÉNÉE CASTEL, abbé de, a French philanthropist, born near Barfleur, in Normandy, Feb. 18, 1658, died Feb. 13, 1743. Establishing himself in Paris, he was admitted into the academy, and became first chaplain to the duchess of Orleans. At the congress of Utrecht (1713) he conceived the ideas of perpetual peace embodied in his *Projet de paix perpétuelle* (8 vols., Utrecht, 1713), and which the cardinal Dubois pro-

nounced "the dreams of a good man." For the severity with which, under the regency, he wrote against the government of Louis XIV., he was expelled from the academy. His works on pauperism, on the means of lessening litigation, on the propriety of allowing priests to marry, and other important social questions, are numerous.

SAINT PIERRE, JACQUES HENRI BERNARDIN DE, a French author, born in Havre, Jan. 19, 1737, died in Eragny, Jan. 21, 1814. He was educated as an engineer, and received a commission in the French army, from which he was dismissed for an act of insubordination. For several years he led a wandering life over Europe, remaining for four years in the military service of Russia, where he endeavored to interest the empress in a scheme for the establishment in the East of an ideal republic. Returning to Paris, he procured a commission as engineer in Mauritius, with the real purpose of going to Madagascar to fortify Fort Dauphin, a French settlement. Disliking his associates, St. Pierre went to Mauritius, and finally returned penniless to Paris in 1771. By the advice of D'Alembert, Mlle. Lespinasse, and others, he prepared for publication a narrative of his voyage to Mauritius; but having been cheated by his publisher, he renounced with disgust the profession of an author, kept aloof from the world, and associated chiefly with Rousseau. After the departure of the latter to Ermenonville in 1778, and the withdrawal of a small government stipend, he was obliged to support himself, and in 1784 he produced his *Études de la nature* (3 vols., Paris), which attracted much attention. It was followed in 1788 by his celebrated tale of *Paul et Virginie*, suggested by his recollections of Mauritius. In 1792 he was appointed by Louis XVI. keeper of the *jardin des plantes*, and in 1794 by the convention professor of morals in the normal school. Protected subsequently by Joseph Bonaparte and pensioned by the emperor Napoleon, he passed the last years of his life in easy circumstances at an elegant retreat near Essonne, and afterward at Eragny on the Oise. His works, beside those already mentioned, are: *Vœux d'un solitaire* (1789); *La chaumière Indienne* (1791); *Harmonies de la nature* (3 vols., 1796), which, like his *Études*, is the production of a poet rather than of a naturalist; *Récits de voyage*, an account of his journey to Russia; *Essai sur J. J. Rousseau*; and a few fragments in poetry and prose. His complete works were published in Paris in 1818-20, with a notice of his life and literary labors (12 vols. 8vo.), followed in 1826 by his "Correspondence" in 4 vols.

SAINT QUENTIN, a town of France, in the department of Aisne, on the river Somme, at the head of the canal of St. Quentin, 87 m. N. E. from Paris, with which it is connected by railway; pop. in 1856, 26,128. The cathedral is one of the finest Gothic structures in France. Its manufactories of thread, of cotton, linen,

and woollen goods, tissues, and laces, and its iron foundries and copper and lead factories, employ in the town and country around about 125,000 operatives. According to tradition St. Quentin preached and suffered martyrdom here in A. D. 287. The town was the capital of the counts of Vermandois in the 8th century, was claimed by the crown in the 12th, given to the duke of Burgundy in 1435, and reclaimed by the crown in 1477. It was taken by the Spaniards under Emanuel Philibert of Savoy in 1557, in the great battle of St. Quentin, but restored to France by the treaty of Cambrai. The manufacture of lawn was commenced here in 1579.

SAINT SALVADOR. See BAHIA.

SAINT SEBASTIAN, a seaport city of Spain, capital of Guipuzcoa, situated on the bay of Biscay, 10 m. W. from Fuentarrabia; pop. 13,000. It occupies a peninsula, which is insulated at high water, and is strongly fortified with walls and a citadel on an eminence called Mount Urgull. The harbor is small, but the foreign commerce is considerable. The city has several churches and convents, civil and military hospitals, and handsome public squares. It was captured by the French in 1719, 1794, and 1808, and by the British with great loss Aug. 31, 1813, when most of it was burned.

SAINT SIMON, CLAUDE HENRI, comte de, a French philosopher, and the founder of one of the first and most important socialistic sects, born in Paris, Oct. 17, 1760, died May 19, 1825. The offspring of a younger branch of the noble family of this name, he entered the army and was made a captain when scarcely 17 years old. In 1779 he went to America, fought under Bouillé and Washington, was made prisoner with the count de Grasse in 1782, and on the conclusion of peace returned to France and was promoted to a colonelcy, although but 23 years old. In 1785 he visited Holland, and tried to persuade the states-general to undertake, in conjunction with France, an expedition against the British possessions in India; he then went to Spain, where he proposed, by means of a canal, to put Madrid in direct communication with the sea; but in neither country did his eccentric plans succeed. On his return to France, finding the revolution in full blaze, he threw aside his aristocratic surname and introduced himself as plain citizen Simon, alias Bonhomme. In partnership with Baron von Redern, a Prussian, he made enormous profits by buying and selling what was then called national property, and established a line of public stages which also became prosperous; but when, in 1797, he broke off the partnership, he accepted 144,000 francs in specie as his share of the assets. For the next 10 years he devoted himself solely to researches in the various branches of knowledge, calling around him scientific men of all kinds, and, when he had seen all that France could offer him, made a tour of Germany, England, Switzerland, and Italy, looking for "any new capital idea" that might have sprung up

in those countries. In 1801 he had married Mlle. de Champgrand, the daughter of an old companion in arms; but, being satisfied that, however meritorious in other respects, she was intellectually no match for the "first of men," as he styled himself, he sought and procured a divorce from his young wife, who afterward became Mme. de Bawr, and won a reputation as a novelist. The count (for he had resumed his name and title) appeared in 1807 in the character of a social reformer; and his *Introduction aux travaux scientifiques du XIX<sup>e</sup> siècle* (2 vols. 4to., Paris) expounded the fundamental ideas of a system which he was devising for the reorganization of the sciences and the reconstruction of social order. This system he intended to follow up in its various branches by the publication of a "New Cyclopædia," and in 1810 published his "Preliminary Discourse" to that great work. To print this pamphlet he spent the little that was now left him of the money he had formerly made by his enterprise, and during the two following years often had to struggle against misery and destitution; more than once he was constrained to pawn his clothes to procure food, and he thought himself fortunate to obtain a subordinate clerkship in the *mont de piété*, at the salary of 1,000 francs a year. Being obliged by ill health to give up this situation, some of his friends furnished him with an adequate income, and he resumed the propagation of his doctrines. He then met with Augustin Thierry, who, carried away by youthful enthusiasm, became his amanuensis and adopted son; and with the help of the future historian, he produced *De la réorganisation de la société Européenne* (8vo., Paris, 1814), and *L'industrie, ou discussions politiques, morales et philosophiques, dans l'intérêt de tous les hommes livrés à des travaux utiles et indépendants* (4 vols. 8vo., 1817-'18). A part of the latter performance was entirely from the pen and even bore the signature of Augustin Thierry; but an estrangement soon occurred between them, and Saint Simon sought other collaborators, among whom were Auguste Comte, Olinde Rodriguez, Buchez, Bazard, and especially Enfantin, who was afterward the head of the sect. Through them he was enabled to give to the public *L'organisateur* (1820), a work for which he was prosecuted but acquitted; *Du système industriel* (3 parts, 8vo., 1821-'2); *Catéchisme des industriels* (8vo., 1824); *Opinions littéraires, philosophiques et industrielles* (1825); and finally *Le nouveau Christianisme* (8vo., 1825). (See SOCIALISM.) All these publications made but little impression. Notwithstanding the devotion and kindness of his disciples toward him, the circumstances of the philosopher were far from improving; the year 1823 was perhaps the bitterest of his life, and in a fit of despair he attempted to shoot himself through the head, but he merely lost one eye. In this he saw a providential dispensation, returned with increased zeal to the good work, and two years

later breathed his last in comparative peace amid his disciples. (See ENFANTIN.)

SAINT SIMON, LOUIS DE ROUVROY, duke, a French nobleman celebrated for his posthumous *Mémoires*, born Jan. 16, 1675, died March 2, 1755. When scarcely 16 years old he entered the regiment of gray musketeers, distinguished himself on several occasions during the war of the league of Augsburg, and reached the rank of *mestre-de-camp*. In 1702, failing to be promoted to a brigadier-generalship, he resigned his commission, but continued at the court, and was one of those courtiers who, being indisposed to approve of the king's policy in all circumstances, gathered around the duke of Burgundy, and planned political reforms for the future. On the death of Louis XIV. he aided the duke of Orleans, with whom he had for years been on friendly terms, to seize upon the regency, and was himself appointed a member of the regency council. In political affairs his advice was sought for by the regent, but seldom followed. Under the pressure of the financial difficulties bequeathed by Louis XIV. to his successor, he strongly urged upon the government the necessity either of resorting to bankruptcy or of summoning the states-general, opposed John Law's system, and contemptuously shunned those monetary speculations in which so many noblemen shared at that time. He was a faithful supporter of the alliance between France and Spain, while the regent, under the influence of Dubois, leaned toward England; and when in 1721 a reconciliation took place between the two branches of the house of Bourbon, he accepted the French embassy to Madrid, and succeeded in negotiating a double marriage, which was to bind them more intimately together, but which afterward failed. On the regent's death he lost all his influence, and in 1726 was directed not to attend the court so punctually at Versailles; he therefore retired to his estates, where he devoted his time to the completion of his *Mémoires*, which were begun in 1694, and which present the most graphic picture of the latter part of Louis XIV.'s reign and the regency of the duke of Orleans. The freedom of judgment and boldness of expression, the fire of passion and pungent satire, which pervade the whole work, would have made its publication dangerous during its author's life; he consequently ordered that his *Mémoires* should not be given to the public till 40 years after his death. The government itself took good care that this prohibition should be observed, as on the duke's demise it caused all the manuscripts to be seized, and taken for safe keeping to the archives of the kingdom. A few persons, as Voltaire, Duclos, and Marmontel, were by special favor allowed to peruse them; but it was not till 1788 that a first specimen was presented to the public eye in 3 vols. 8vo., which were in 1789 followed by 4 supplementary volumes. A new edition, with additions and annotations, was published by Soulaie (Strasbourg, 1791); but

this, like the previous ones, consisted of fragments only. Charles X. having permitted the manuscripts to be returned to the family, the first complete edition was published by the then marquis de Saint Simon (21 vols. 8vo., Paris, 1829-'30). The best edition is that of Cheruel (20 vols. 8vo., 1856-'9). Notwithstanding its bad grammar, incorrect phraseology, and eccentricities of style, this work has taken a place among the standards of French literature. Valuable essays upon it may be found in Ste. Beuve's and Planche's *Portraits littéraires*. An abridgment was published in English by Bayle St. John (4 vols., London, 1837).

**SAINT TAMMANY**, a S. E. parish of Louisiana, lying on Lake Pontchartrain, between Pearl and Tangipahva rivers; area, about 1,200 sq. m.; pop. in 1860, 5,406, of whom 1,841 were slaves. The surface is uneven, partly pine barrens, and the soil not very fertile. The productions in 1850 were 22,352 bushels of sweet potatoes, 17,849 of Indian corn, 97,793 lbs. of rice, and 41 bales of cotton. There were 18 grist mills, 17 saw mills, 14 churches, and 500 pupils attending public schools. Capital, Covington.

**SAINT THOMAS**, one of the Virgin group of West India islands, belonging to Denmark, 33 m. E. from Porto Rico; area, 24 sq. m.; pop. in 1855, 12,560. The surface is elevated and rough, highest in the centre. It was formerly well wooded, but the cutting off of the wood has subjected it to frequent and severe droughts. The soil is sandy and not very fertile. Only about 2,500 acres are under cultivation, and cotton and sugar cane are the principal crops. It is open to the commerce of all nations, and is a depot of goods for the adjacent islands. It is visited by about 3,000 vessels annually. Capital, Charlotte Amalie.

**SAINT THOMAS**, an island of the gulf of Guinea, belonging to Portugal, in lat.  $0^{\circ} 25' N.$ , long.  $6^{\circ} 3' E.$ ; area, 145 sq. m.; pop. 20,000. In its centre, the peak of St. Anna rises to the height of 7,020 feet. The valleys are very fertile. The climate of the lowlands is unhealthy, but the higher grounds of the southern part are salubrious, being swept by fresh breezes. There are large numbers of domestic animals; and cotton, sugar, indigo, cocoanuts, canella bark, sweet potatoes, manioc, dates, and maize are produced. A Portuguese bishop resides at the capital, St. Thomas. The island was discovered on St. Thomas's day, 1471, by Vascoellos.

**SAINT THOMAS, CHRISTIANS OF.** See CHRISTIANS OF ST. THOMAS.

**SAINT VINCENT**, one of the Windward group of West India islands, belonging to Great Britain, 100 m. W. from Barbados; area, 132 sq. m.; pop. in 1851, 30,128. The surface is mountainous, a ridge of high hills extending through the whole length of the island, but intersected by fertile and beautiful valleys. In the N. W. there is a volcano, the Souffrière, 8,000 feet high, with a crater 3 m. in circum-

ference and 500 feet deep. There was a terrible eruption from this volcano in 1812. The forests are very extensive and beautiful. The soil is rich and productive, and the climate humid, but not unhealthy. Sugar, coffee, rum, molasses, arrowroot, and cotton are the principal products. It was discovered by Columbus, and occupied for some years by a black population who were shipwrecked from a slave ship on the island. It was subsequently alternately in the power of the French and English, but finally ceded to the latter in 1763. Capital, Kingstown.

**SAINT VINCENT, EARL OF.** SEE JERVIS, SIR JOHN.

**SAINT VITUS'S DANCE**, or CHOREA, a disorder affecting the nerves of motion, occurring usually in young persons from the age of 10 to 20, and more frequently in females. Its approach is heralded by languor and lassitude, slight dragging of one of the limbs, a furred tongue, general disorder of the stomach and bowels, occasionally pain in the occipital portion of the head, frequently a sense of awkwardness which leads the patient to avoid coming into the presence of strangers, and sudden muscular contortions, apparently executed involuntarily. Gradually the muscles cease to be under the full control of the will; the head shakes upon the occurrence of the slightest excitement, and the patient cannot control its motion except by a violent and painful exercise of volition. If he attempts to carry food or drink to his mouth, the hand approaches part way and then moves off suddenly in another direction. The hands and feet will not keep still; the face is distorted by the spasmodic action of the muscles; the motions of the body in walking are very uncertain, and one leg and the opposite arm will seem paralyzed. The articulation is impeded and painful, the temper variable, and the patient exceedingly sensitive. Occasionally the action is more violent. If watched or noticed, the spasmodic action is invariably aggravated. The most frequent predisposing causes are those changes which take place at the age of puberty. Among the exciting causes are fright, irritation of the stomach and bowels, improper diet, and disordered menstruation.—The treatment is generally by tonics and antispasmodics. Iron in some of its forms, and the cyanide in preference to any other, and perhaps some of the preparations of zinc, the cobalt or black snake-root, and the terebinthines have all been recommended. The homœopaths rely upon agaricus, arsenicum, conium, &c. Spontaneous recovery is perhaps as frequent as cure; but in this there is a marked tendency to relapse on the return of the same season of the year.

**SAINTE BEUVE**, CHARLES AUGUSTIN, a French critic and poet, born at Boulogne-sur-Mer, Dec. 23, 1804. He repaired to Paris when scarcely 15 years old, completed the course of study at the Charlemagne college, then applied himself to medicine, especially anatomy, and

was admitted as an *externe* to the St. Louis hospital. About 1825 he became connected with the *Globe*, a leading literary newspaper under the direction of his former professor, Pierre Dubois. One of his first essays here was an enthusiastic criticism of Victor Hugo's *Odes et ballades*, by means of which he became acquainted with the poet and a member of a society called the *cénacle*, acknowledging Hugo as its guide, and the aim of which was the introduction into French literature of freer and more elevated principles than had of late prevailed. In 1828 he published a *Tableau historique et critique de la poésie Française et du théâtre Français au XVI<sup>e</sup> siècle*, in which, while trying to revive the popularity of Ronsard, he expressed some of his views upon the renovation of literature, which he followed up in his contributions to the *Globe*. In 1829 he appeared anonymously as a poet in his *Vie et poésies de Joseph Delorme*, which, being an attempt to break down the prevalent formalism of French poetry, and containing beside many eccentricities, was bitterly assailed by the critics of the classical school. Sainte Beuve and his friends were now styled the *romantiques*. Another volume of poems, breathing a more subdued and healthy spirit, *Les consolations*, appeared in March, 1830. The revolution of July transferred the *Globe* to the Saint Simonists, who made it the organ of their doctrines, to the diffusion of which Sainte Beuve for a while contributed, but did not formally enlist in the sect. He soon connected himself with the *Revue des deux mondes* under Buloz, and with the *National*, conducted by his friend Armand Carrel. About the same time he was introduced to Lamennais, whose influence over the mind of the young poet was evidenced by the publication of his strange novel, *Volupté* (8vo., 1834), which did not prove popular, but was warmly discussed in literary circles. In 1837 Sainte Beuve, through Vinet's influence, was called to Switzerland, and delivered at Lausanne a series of lectures which became the groundwork of his *Histoire de Port Royal*. About the same time he published a third volume of poems, *Pensées d'Août*, of too melancholy a tone for the public taste. Returning to France, he was appointed by Thiers to an office in the Mazarine library, which enabled him to complete and publish the first volume of the *Histoire de Port Royal*, the 4th and last volume of which did not appear till 1856. He was elected to the French academy in 1845. After the revolution of Feb. 1848, he removed to Liège, Belgium, where he had been offered a professorship of literature; but when he saw in the accession of Louis Napoleon to power the reestablishment of tranquillity, he returned to Paris and became at once a regular contributor to the *Constitutionnel*, a newspaper wholly devoted to the Bonapartist interest. Here he weekly published articles which have been reprinted in book form under the title of *Causeries du Lundi* (13 vols., 1851-'7). His

previous contributions to the *Revue des deux mondes* and other periodicals had been gathered under the following titles: *Critiques et portraits littéraires* (5 vols. 8vo., 1832-'9); *Portraits littéraires* (2 vols. 12mo., 1844); *Portraits de femmes*, and *Portraits contemporains*. When the official *Moniteur* was so enlarged as to become the most important of the French daily periodicals, Sainte Beuve was placed at the head of its critical literary department. His partisanship was also rewarded by his appointment to the professorship of Latin poetry in the college of France; but the students, unable to reconcile his present Napoleonic views with the republican principles he had entertained when a fellow laborer of Armand Carrel, hissed him from his chair on his first appearance, and he did not afterward resume it. In 1857 he was appointed master of conferences in the normal school, which position he still occupies, beside continuing his contributions to the *Moniteur*.

SAINTINE, the pseudonyme of JOSEPH XAVIER BONIFACE, a French author and dramatist, born in Paris, July 10, 1797. Soon after finishing his studies, he won a prize from the French academy by a poem entitled *Le bonheur de l'étude*, and in 1820 another by his *Discours sur l'enseignement mutuel*; and in 1837 he received the Monthyon prize of 3,000 francs for his story of *Picciola*, which has passed through 20 editions and been translated into many languages. In 1823 he published a volume of *Poèmes, odes et épîtres*. Either alone or in conjunction with others he has produced more than 200 dramatic works, generally of a light character, all of which have been brought out under the name of Xavier; while his romances and other writings, of which he has been almost equally prolific both in separate publications and in periodicals, have appeared under that of Saintine, by which he is best known. Among the latter may be mentioned *Jonathan le visionnaire* (2 vols. 12mo., 1825), a collection of moral and philosophical stories; *Histoire des guerres d'Italie* (2 vols. 8vo., 1826-'8), forming part of a general résumé of French military history; *Les métamorphoses de la femme* (3 vols. 8vo., 1846); *Seul!* translated into English by Anne T. Wilbur, under the title of "The Solitary of Juan Fernandez, or the real Robinson Crusoe" (Boston, 1851); and *Les trois reines* (2 vols. 8vo., 1853).

SALA, GEORGE AUGUSTUS, a British author, born in London in 1827. He was educated for an artist, but abandoned that profession for literature. He was one of the earliest and most prolific of the contributors to "Household Words," and in 1856 published a poem entitled "La Belle Alliance, or Harlequin Good Humour and y<sup>e</sup> Fielde of y<sup>e</sup> Cloth of Gold." A series of articles which had appeared in "Household Words" were reprinted in 1858 under the title of "A Journey due North, being Notes of a Residence in Russia in the Summer of 1856." Two other works first printed in periodicals have been since separately republished, viz.: "Twice



round the Clock, or Day and Night in London," and "The Baddington Peerage, who bore it and who wore it, a Story of the Best and Worst Society." Mr. Sala is the editor of the "Temple Bar," a monthly periodical established in London in 1860, in which his "Seven Sons of Mammon," an elaborate novel, appeared.

**SALADIN** (**MALEK AL-NASSEE SALAH ED-DEEN ABU-MODHAFFER YUSEF**), sultan of Syria and Egypt, born in the castle of Tecrit on the Tigris in 1137, died in Damascus, March 4, 1193. He was the son of Ayub, a Koord in the service of the famous Nouredin, sovereign of Syria, and in 1163 accompanied his uncle Sheerkook to Egypt as an officer in the army destined to reinstate the vizier Shawir, and ultimately to reduce the country to the sway of Nouredin. During 3 campaigns he displayed great military capacity, and, according to Latin chroniclers, the honor of knighthood was conferred upon him by the king of Jerusalem for his skilful defence of Alexandria against a superior force. In 1168 Sheerkook, having reduced the country, became viceroy of Nouredin, and upon his death in the same year his authority devolved upon Saladin, who, profiting by the crafty councils of his father, paid nominal deference to Nouredin, but strengthened his own power until he was enabled to bid defiance to the sultan. The death of Nouredin in 1174 left him absolute master of Egypt, with abundant resources to push his ambitious designs in almost any quarter; and taking advantage of the disturbances which convulsed Syria, he invaded that country, defeated in several great battles the youthful heir of Nouredin, and within 4 years made himself master of southern Syria and a considerable portion of Mesopotamia. After devoting several years to the affairs of Egypt, he completed in 1182-'4 the conquest of Syria; his brother subdued the richest portions of Arabia, and by the year 1185 his empire extended from Tripoli in Africa to the Tigris, and from Yemen on the Arabian sea to the Taurus, the Latin kingdom of Jerusalem being alone independent of his sway. As ruler of this vast empire he assumed the title of sultan. The violation by the freebooting Reginald de Châtillon of a truce concluded in 1185 between the Latins and Saladin, afforded the latter a pretext for invading the Holy Land with an army of 80,000 horse and foot. Through rashness and incapacity on the part of the Christian leaders, or, as has been insinuated, the treachery of Raymond, count of Tripoli in Syria, their army was overthrown at the famous battle of Hittin (July, 1187) with a loss of 30,000 men. Guy de Lusignan, king of Jerusalem, who fell into the power of Saladin, was treated with chivalric courtesy; but Reginald de Châtillon, his fellow captive, was decapitated by the sultan's own hand. Acre, Ascalon, and other important towns were speedily subdued, and on Oct. 2, 1187, Jerusalem surrendered to him after a siege of two weeks. The clemency of Saladin was success-

fully invoked in favor of the inhabitants, who were offered their freedom at a moderate ransom, several thousand of the poorer classes being exempted from payment, and many being aided by the alms of the conqueror. Tyre, however, reinforced by Conrad of Montferrat, held out against him, and Saladin, after an unsuccessful siege of the city, made a disgraceful retreat to Damascus. The third crusade (1189) aroused him to the defence of his new possessions, and for two years (1189-'91) he thwarted every attempt of the crusaders to retake Acre. When the city finally capitulated to Richard I. of England and Philip Augustus of France, the former, left by the departure of the French king sole commander of the Christian hosts, led the crusaders down the coast to Ascalon, his march of 100 miles being, as Gibbon says, "a great and perpetual battle of 11 days." At the battle of Arsouff, fought on St. George's day, in which the Moslems were routed, Saladin, seeing Richard fighting on foot, is said to have sent him his own horse as a present. Ascalon having fallen, the crusaders in the spring of 1192 advanced within a day's march of Jerusalem, but were induced by dissensions in their own ranks to retreat when the city seemed fairly within their grasp. Tedious negotiations followed, during which many acts of courtesy passed between the Christian king and the sultan, and in 1192 a 3 years' truce was concluded. The incessant toils of the last few years had however impaired the health of Saladin, and he died of a bilious fever after an illness of 12 days. His virtues and valor have been lauded by both Christians and Mohammedans; and, making due allowance for the exaggerations and inventions of the chroniclers, enough remains on record to stamp him as the superior in many respects of most of the Christian princes with whom he contended.

**SALAMANCA**, a province of Spain, in Leon, bounded N. and N. E. by Zamora and Valladolid, E. by Avila, S. by Caceres, and W. and N. W. by Portugal; area, 7,455 sq. m.; pop. in 1857, 263,516. A great part of the surface is mountainous, some of the peaks being higher than the line of perpetual snow. The drainage belongs to the basins of the Douro and Tagus; the former flows upon the N. W. boundary line, and receives numerous tributaries, of which the Tormes is the principal. There are several hot springs; and the most valuable minerals found are gold, iron, copper, lead, saltpetre, and rook crystal. More than half the surface is covered with forests.—**SALAMANCA** (anc. *Salamantica*), the capital, is situated on the river Tormes, 120 m. N. W. from Madrid; pop. about 15,000. It is enclosed by ancient walls washed by the river, which is crossed by a Roman bridge of 27 arches. The cathedral, begun in 1513, is a fine sample of the florid Gothic. There are numerous parish churches and convents, the most remarkable of the latter being the Dominican and Bernardine convents; the Augustinian convent

contains many sculptures and paintings, and the church attached to it is considered one of the finest in Spain. The university of Salamanca was founded about the close of the 12th century. In the 14th century it was attended by 12,000 students, but during the 16th it began to decline. Many of the collegiate buildings were destroyed by the French. The whole number of pupils at present in attendance does not exceed 300. Leather, woollen goods, hats, and earthenware are manufactured. Salamanca was an ancient city of the Vettones. It was taken by Hannibal in 222 B. C. Under the Romans it was made a military station, and the remains of a road made by them and some monuments are still extant. It was captured and ravaged by the Moors, who were finally expelled from it in 1095. From 1484 to 1486 Columbus was lodged in the Dominican convent, and the monks supported his scheme of discovery after it had been condemned by the university. The battle of Salamanca, in which the French were defeated by Wellington, July 22, 1812, took place 4 m. S. E. of the city.

**SALAMANDER**, the popular name of most of the batrachian reptiles with persistent tail (*urodela*), and which lose the gills in the adult condition (caducibranchiates). The family of *amphiumida* has been noticed under **MENOPOMA**. The family *salamandridae* has been divided into two groups, the aquatic and terrestrial, of which the former will be described under **TRITON**. Schneider reunited the water and land salamanders into a single genus *salamandra*, comprising the genera *salamandra* and *triton* of Laurenti. Mr. Baird (in the "Journal of the Academy of Natural Sciences," vol. 1, Philadelphia, 1850) makes no generic distinction between the aquatic and terrestrial species, though he subdivides *salamandra* into several genera established by Rafinesque, Tschudi, and others. The division into groups according to general habitat will be retained here, as facilitating description, and the species now noticed will be those which belong to the old genus *salamandra* (Laurenti). In this group the body is lizard-like, the limbs 4, the maxillary and palate bones with minute teeth, the tongue more or less pediculated and free; there is no sternum, the ribs are rudimentary, and the pelvis is suspended by ligaments; there are in the adults neither gills nor gill openings, and the lungs are well developed; the eyes are prominent, and furnished with lids; the skin is without scales, and has numerous warty glands which secrete an acrid viscid fluid; the tail is generally cylindrical. They live on land in the adult state, and are found in the water only during the breeding season; they frequent damp places, and are found only in the northern hemisphere, in Europe, and especially in North America. The young, instead of being wholly developed in the water, in some are retained so long within the oviduct that they are born alive, having undergone a portion of their metamorphosis; the larvae live

constantly in the water and breathe by external gills, which disappear with the gill openings when the respiration becomes pulmonary; the anterior limbs are developed earlier than the posterior, the former having 4 and the latter 5 toes. From large glands behind the eyes and on the body is secreted a yellow matter so abundantly and rapidly, that it gave rise to the popular belief, once extensively prevalent, that they possess the power of extinguishing and of remaining unharmed in fire, to test which many have been cruelly destroyed; this acrid secretion seems to be poisonous to some of the lower animals, and has caused their bite and even their touch to be regarded as venomous. They are generally of small size, rarely exceeding  $6\frac{1}{2}$  inches in total length. Some of the tritons are essentially terrestrial in their habits. —Among the North American species may be mentioned the salmon-colored salamander (*S. salmonea*, Storer; genus *pseudotriton*, Tschudi), about  $6\frac{1}{2}$  inches long, yellowish brown above, with the sides of the head, neck, body, tail, and legs salmon-colored; upper parts and sides with irregular grayish markings, and lower parts white. It has been found from Vermont to South Carolina in mountainous and moist regions; it thrives well in confinement, feeding voraciously on flies and other insects. The red-spotted salamander (*S. rubra*, Daudin; *P. ruber*, Tsch.) is 4 to 6 inches long, red above with many small black points, sides red and abdomen orange red, both unspotted; it is a very common species under rocks and fallen trees, and preys on insects; it inhabits the Atlantic states from Massachusetts to Florida; it is a handsome species, and the same as the *S. maculata* (Green). In these species the body is very short, and the tail is equal to or less than the body. The blue-spotted salamander (*S. glutinosa*, Green; *plethodon*, Tsch.) is about 7 inches long, bluish black above, with small white spots on back and tail and larger ones of the same color on the flanks; the tail is nearly twice the length of the body. This is a common species from Massachusetts to the gulf of Mexico, living in preference under fallen trees; the specific name was derived from the great quantity of glutinous matter suddenly given off from the skin. The red-backed salamander (*S. erythronota*, Green; of the same genus of Tschudi) is about 3 inches long, with a reddish brown band from the snout to the end of tail, sides yellowish brown, and abdomen whitish; tail shorter than the body, and separated with great facility by the animal when seized by it, a faculty common to many of the family. It is a very handsome and common species, very agile, found under stones and dead trees with snails (*helix*) from the Lake Superior copper region to Pennsylvania; the eggs are deposited in packets under damp stones. The painted salamander (*S. picta*, Harlan; *demonognathus fuscus*, Baird) is about 4 inches long, dusky above, tinged with purple and marked with 2 series of elongated, quadrangular red

spots, and a red mesial line on tail; lower parts pepper-and-salt gray with a purplish tinge. It is found from northern New York to the Carolinas; the eggs are wrapped round the body of the female, which remains in a damp place until they are hatched. The striped salamander (*S. bilineata*, Green; *spelerpes*, Raf.) is about 4 inches long, above brownish yellow with a black lateral line, and yellow below; anterior limbs very small and delicate, and the tail long and slender; it is found from northern New York to Georgia. The long-tailed salamander (*S. longicauda*, Green) is about 6 inches long, of which the tail is more than  $\frac{1}{4}$ ; the body is lemon yellow above with numerous small irregular black spots, tail with transverse black bands, and lower parts yellowish white; its habits are more aquatic than in most land salamanders; it is found from northern New York to Kentucky. The symmetrical salamander (*S. symmetrica*, Harlan; *notophthalmus miniatus*, Raf.) is about 4 inches long, brownish red above, with a row of symmetrically arranged deep red spots on each side; lower parts orange with black dots; tail longer than the body and compressed; skin rough. It is found from Maine to Florida; in young specimens the whole back is covered with minute black dots, and the sides have fewer spots. The violet salamander (*S. subriolacea*, Bart.; *ambystoma*, Tsch.) is about 6 inches long, body and tail above bluish black with a row of round or oval yellow spots on each side, the under surface of the same color tinged with purple; it passes most of its time in moist places, and is found from Maine to South Carolina. The banded salamander (*S. fasciata*, Green; the *S. opaca* of Gravenhorst) is about 5 inches long, pale ash-colored above, with irregular transverse bluish black blotches on the back and bars on the tail; lower parts purplish blue; it is found from Massachusetts to Georgia. In the species belonging to the last two genera of Rafinesque and Tschudi, there are no sphenoidal teeth, and the carpus and tarsus are ossified in the adults, and the tongue rudimentary in the former and large and fleshy in the latter; in the other subgenera sphenoidal teeth are sometimes present, and the tongue is generally protracile. Other genera, and several other species of American salamanders, are described by Mr. Baird in the above mentioned journal, in vol. x. of the Pacific railroad reports, and in vol. ii. of the Mexican boundary survey. They are all not only harmless animals, offering no resistance when captured, but are positively beneficial to man from the great numbers of noxious insects and larvæ which they devour.—The common salamander of Europe (*S. maculata*, Merrem) is black with more or less large yellow spots. The whitish fluid exuded by this species has given rise to the supposed fire-resisting and poisonous qualities of the genus. It is found in central Europe, and in the mountainous parts of S. Europe, in cool and moist places, and feeds on insects, worms, and small mollusks; it attains a length

of 7 or 8 inches; it is viviparous, bringing forth 20 to 30 young at a birth.

SALAMIS (now *Koluri*), an island of Greece, in the gulf of Ægina, of very irregular form, lying near Attica, from which it is separated by a narrow channel, and 10 m. W. of Athens; greatest length about 10 m., average width about 3 m.; area, about 30 sq. m.; pop. 5,000. One small stream flows into the sea on the S. W. coast. The chief modern city is Koluri, situated on the W. shore of the island at the head of the bay of the same name. The island is hilly, but grows some olives, vines, and cotton. On the E. shore can be seen the ruins of the ancient city of Salamis.—The island was in the time of Pisistratus a subject of dispute between Attica and Megaris, and finally became one of the Attic demi. It was celebrated as the birth-place of Solon and Euripides, but most of all for the great naval victory gained by the Greeks under Themistocles over the fleet of Xerxes in 480 B. C. (See GREECE, vol. viii. p. 443.) Several times in modern wars the inhabitants of Attica have been forced to take refuge in Salamis.—Salamis was also the name of an ancient city of Cyprus, the most important in that island.

SAL AMMONIAC. See AMMONIA.

SALAYER ISLANDS, a small group in the Indian archipelago, of which the principal is the Salayer or Great Salayer island, separated from the S. W. extremity of Celebes by the strait of Salayer, 13 m. wide, and forming part of the Dutch province of Macassar; lat. of N. point  $5^{\circ} 47' S.$ , long.  $120^{\circ} 28' E.$ ; extreme length 30 m., breadth 8 m.; pop. about 60,000.

SALDANHA OLIVEIRA E DAUN, João CARLOS, duke of, a Portuguese statesman and general, born at Arinhaga in 1780. He is the grandson of the celebrated marquis of Pombal, and at an early age became a member of the council of administration for the colonies. When the royal family fled to Brazil, he remained in Portugal, and offered no resistance to the French rule. In 1810 he was sent to England as a prisoner, and after a short residence there went to Brazil, where he served in the army, and was employed in a diplomatic capacity. Having returned to Portugal, he was in 1825 appointed minister of foreign affairs by John VI., after whose death in 1826 he became governor of Oporto, and under the constitution of Dom Pedro minister of war, and effectually repressed the Miguelist disturbances in Algarva and in the N. of Portugal. On the change of the cabinet, June 9, 1827, he retained his portfolio; but having endeavored in vain to remove two suspected members of the regency, he resigned 5 days after, and retired to England. Dom Miguel having usurped power, Saldanha returned to Oporto, put himself at the head of a liberal movement, raised a small army, and sought an opportunity for a decisive battle. His troops however abandoning him, he escaped again to England, whence he went to France. In 1832 Dom Pedro collected some

forces in France and landed in Portugal with Saldanha, whom he made commandant of Oporto, and subsequently marshal and generalissimo. Aided by the duke of Terceira, he broke the lines of the Miguelists before Lisbon, defeated them in several battles, and finally terminated the war by taking the capital, and compelling the capitulation of Dom Miguel at Evora. In 1834 he attached himself to the opposition, but in 1835 received from Dom Pedro the portfolio of minister of war and the presidency of the council; but owing to quarrels with his colleagues, and want of support in the chamber, he resigned in November of the same year. He then went into the opposition, but in the revolution of Sept. 1836, he sided with the conservatives, and intrigued for the overthrow of the revolutionary government.—Failing in this, he went into exile, and remained abroad for 10 years, when he was recalled by the queen in 1846, and formed a ministry which by the aid of foreign powers maintained itself against the revolutionists of 1846-'7. In 1849, however, it was overthrown, and Costa-Cabral became a second time virtual dictator, and offered him a place in the ministry, which he refused, and went again into the opposition; and in 1851 he succeeded in effecting a new revolution, which once more placed him in power. The accession of the new king Dom Pedro II. in 1856 occasioned his downfall. He then resigned his place as commander-in-chief of the army, in order to place himself anew at the head of the opposition.

SALE, in law, a contract between parties to give and transfer rights of property for money, which the buyer pays or promises to pay to the seller for the thing bought and sold. The word is often applied indifferently to the transfer, for a consideration, of both real and personal property; but in its proper and technical sense it applies only to that of personal property, the transfer of real property passing under the denomination of a grant or conveyance. The difference between a sale and an exchange is that in the former the price is paid in money, while in the latter it is paid in goods by way of barter. Three things are necessary to constitute a valid sale at common law, viz.: the thing to be sold, the price to be paid for it, and the agreement or consent of the contracting parties that the property in the subject matter should pass from the vendor to the vendee, for the stipulated price given or promised to be given by the vendee. If there is no evidence that the sale is on credit, and, after the bargain is made, the vendee leaves without paying, it is held to be a breach of the contract on his part, and the vendor may if he chooses rescind the sale. But the actual delivery of a chattel, and the acceptance of earnest or part payment by the seller, is evidence of an implied agreement between them that something is left to be done in future, and the legal presumption of immediate payment is thereby rebutted. The buyer however cannot take the goods, not-

withstanding earnest be given, without full payment, unless it is an express condition of the sale. If he does not come, in a reasonable time after request, and pay for and take the goods, the contract may be dissolved by the seller, and he is at liberty to sell the goods to another person. Where, however, express terms are agreed upon whereby the delivery or the payment is postponed to a future time, the sale is in this case complete, and the property in the chattel passes immediately to the buyer. The thing sold must be in actual existence at the time of the sale, otherwise the sale will be invalid. If one man sell to another a horse, and the horse be dead, or if he sell a house or other property which has been destroyed by fire, both parties being ignorant of the fact before sale, it is invalid. If a part only of the subject matter be non-existent or destroyed, and the remainder is capable of transfer or delivery, the buyer has the liberty, at his option, either to rescind or enforce the contract as to such remainder. A mere contingent possibility not coupled with an interest, as all the wool one shall ever have, or any similar indefinite future possession, is not a subject of sale; but if rights are vested and distinctly connected with interest or property, they may be sold. The price to be paid must be ascertained and certain, or so referred to a definite standard that it may be made certain; and the thing sold must also be specific or capable of a certain identification. When made by letter, the contract is complete as soon as a distinct proposition contained in it is accepted *bona fide*, by letter written within a reasonable time, and mailed before the acceptor receives information of a withdrawal of the offer. If the thing is sold for cash, the vendor is entitled to hold possession of it until he receives his pay. He cannot sue for the price until the goods are delivered or tendered; but if they are accidentally destroyed while thus in his possession, and without any fault or carelessness on his part, he may then sue for the price. If the price is not paid, whether the goods are sold for cash or on credit, and they remain in the hands of the seller, he has a lien on them for the price. This lien is destroyed by either actual or constructive delivery of the goods; and if he takes a bill of exchange or promissory note as security for the price, he also loses his lien. After a sale of personal property and a fair and absolute delivery to the purchaser personally, the seller cannot reclaim or retake possession of the property (upon the ground of a lien) because the consideration which was to have been given at the time of the delivery has not been paid, even though the purchaser shortly after becomes insolvent; for the seller's lien being once lost or waived by the delivery, it cannot reattach.—A sale without delivery is not valid, in general, against a third person who buys without notice; and if the goods are sold by the vendor to two different and innocent parties, by transfers equally valid, he who first

obtains possession of the goods will hold them. But as between the seller and the purchaser, delivery is not necessary to complete the bargain; and a *bona fide* sale without any delivery, though it passes the property as between these, yet leaves the goods liable to be taken as the property of the vendor by his creditors. Formerly, when a sale was made and the goods remained in the possession of the seller, this gave rise to an absolute inference in law of fraud. A completed sale without change of possession still raises not only a presumption, but a very strong presumption of fraud; but the old rule is somewhat modified, and the question of fraud is generally considered one of fact for the jury to determine. Symbolical delivery will in many cases be sufficient and equivalent in its legal effect to actual delivery. The delivery of the key of a warehouse in which the goods sold are deposited; or transferring them in the warehouseman's or wharfinger's books to the name of the buyer; or the delivery of a part as representative or as an instalment of the whole, is a delivery sufficient to transfer the property. When the goods sold are of such a nature or in such a situation that a personal possession of them is impracticable or inconvenient, the simple sale and an agreement of the parties will pass the property to the purchaser without actual delivery. If no particular time is appointed by the terms of the contract for delivery or payment, these must be made within a reasonable time; and the seller is bound to keep the things sold until time of delivery with ordinary care and good faith, and otherwise he will be liable should they be injured or destroyed. If the contract is to deliver at the residence of the vendee or any other particular place, and this is not done, the seller is liable even though such a delivery becomes impossible, unless it becomes so through the act or fault of the purchaser. If the goods are to be delivered to the purchaser, but no place of delivery is named, they must be sent to him wherever he may happen to be, or to his house or place of business, unless they were bought to be used for any particular purpose, or at any particular place. When a time and place are expressed in the contract of sale, the buyer must receive and pay for them then and there, and also pay all reasonable charges for keeping after the sale and before delivery. If the goods are sold on credit, they must be delivered without payment; but if the purchaser should become insolvent before delivery, the seller may demand security and refuse to deliver without.—Whenever, in a contract of sale, it is agreed that some particular act shall be done in relation to the thing sold, by either party, as that the goods shall be delivered on a particular day, or on request, or that a promissory note shall be given, this makes a conditional sale. In every sale, where no other express agreement is made, there is an implied condition that the price shall be paid before delivery; and this is re-

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garded as a condition precedent. It is also a condition precedent where some act remains to be done, such as weighing or measuring; and if there is no evidence tending to show the intention of the parties to make an absolute and complete sale, the property does not pass wholly to the buyer until such condition is performed. Where there is a condition precedent which is not performed, but the goods are nevertheless delivered with the understanding that it shall be, the property does not vest in the purchaser on such a delivery until he performs the condition, or the seller waives it; and the right continues in the seller even against those creditors of the buyer who were creditors previous to his purchasing and receiving the goods, but not as against creditors who became so afterward, and who may have given him credit on the strength of his actual possession of and supposed right to the goods. If the buyer neglects or refuses to comply with a condition precedent, and the goods are therefore not delivered, the seller may, after due delay and precautions, resell them, and hold the buyer responsible for any deficiency in the price. In all of these cases the property in the thing sold passes to the buyer by the fact of sale, but he holds it subject to the lien or other reserved right of the seller. Another class of valid sales on condition are those known as "contracts of sale or return," where possession of the goods is given to the purchaser with the privilege of keeping them or returning them within a specified time. If he returns them within this time, the contract is rescinded; but otherwise the sale becomes absolute and complete. When goods are sold at auction, the conditions of sale made known to the buyer by the advertisement, or communicated by the auctioneer at the time of sale, bind both parties, and regulate the transfer and possession of the property. When goods which are only a numerical proportion of an entire bulk are sold, no property passes and the sale is incomplete until such part has been separated and set apart from the remainder and actually delivered.—The seller of goods has not only a lien upon them for the price while they remain in his possession, but he may, in the event of the bankruptcy or insolvency of the purchaser, after he has parted with the possession of them, and while they are *in transitu* on their way to the purchaser, retake them, the price being unpaid. (See STOPPAGE IN TRANSIT.) If a sale be merely colorable, and intended to cover a usurious transaction, no property in the goods will pass thereby to the purchaser. So a sale of goods with intent to delay, hinder, or defraud a creditor, is utterly void as against the creditor, even if the purchaser pays full value for them, unless the purchaser was ignorant of the fraud and purchased them in good faith, as well as for a good consideration. But such a transfer would be good as between the parties thereto, or between either party and a stranger, not a creditor.—Contracts of sale having an immoral or illegal object in view are

void at common law. Trading with an enemy is prohibited by the common law and by the law of nations, and of course contracts with them for the purchase or sale of goods cannot be enforced. Neither can a contract for the sale of goods entered into in contravention of a statutory provision, whether the prohibition be express or implied from the imposition of a penalty, be enforced by action. The obtaining goods upon false pretences, under color of purchasing them, does not change the property; but it has been held that a *bona fide* purchaser of goods for a valuable consideration, from a person who obtained them from the owner by false pretences, amounting even to a felony, will hold them against the first seller, if he (the first seller) voluntarily parted with the possession and intended to part with the title. The sale will never be valid in favor of the purchaser where he obtains the goods by fraud practised upon the seller under color of a purchase, whether on credit or otherwise. Thus, if an infant fraudulently represents himself to be of full age, and by such false representation succeeds in obtaining goods on credit, the sale will be void, and the seller may reclaim the goods from the buyer, or from any one who has not bought the goods of the buyer for value, and in ignorance of the fraud. If a person steals goods and sells them, the property is not thereby changed, but remains in the rightful owner, who may reclaim them wherever they may be found. In England there is an exception to this rule, which is where the goods are sold by the wrongful possessor in market overt, in which case the sale is binding upon the true owner, and the purchaser obtains a good title. But in this country no sale of goods by the wrongful possessor is valid. (For sale with warranty, see WARRANTY.) A conjectural estimate of the value is not a misrepresentation which might avoid the sale; and concealment, to be fraudulent and material, must be a concealment of something which the party was bound to disclose. A seller is unquestionably liable to an action for deceit if he fraudulently represents the quality of the thing sold to be other than it is, in some particulars which the buyer has not equal means with himself of knowing; and he is if he do so in such a manner as to induce the purchaser to abstain from making the inquiries which for his own security and advantage he would otherwise have made.

SALE, SALLEE, or SLA, a walled town of Morocco, on the W. coast, at the mouth of the river Bu Regreb; pop. about 10,000. The chief manufacture is carpets; and the exports consist principally of wool. On the opposite side of the river is the town of Rabatt. In 1851 both Salé and Rabatt were bombarded by the French.

SALE, GEORGE, an English oriental scholar, born in Kent in 1680, died in London, Nov. 14, 1736. Little is known of his personal history. He was educated at King's school, Canterbury, was by profession a lawyer, and

was one of the founders of a society for the encouragement of learning established in 1736. He was a contributor to the "Universal History," edited by Swinton and others, and wrote for that work the cosmogony, and parts of oriental history. He was also one of the authors of the "General Dictionary" (10 vols. folio, London, 1734), and probably had a great share in the translation of the work of Bayle, which is incorporated in the dictionary. By far the most important of his works, and the one by which he is now remembered, is the translation of the Koran into English from the original Arabic, with notes and comments from the most approved commentators (4to., London, 1734). To this version there were prefixed dissertations on the social and religious condition of the Jews, Christians, and Arabs at the time of the coming of Mohammed, on the leading sects among the Mohammedans, and on other subjects. The translation is executed with fidelity. Not long after the death of Sale, a catalogue of his oriental manuscripts was published, which contained valuable articles in Arabic, Persian, and Turkish literature. They were purchased for the Radcliffe library at Oxford.

SALEM, a S. W. co. of New Jersey, bordered W. by the Delaware river, and drained by Salem, Alloway's, and other creeks; area, 540 sq. m.; pop. in 1860, 22,458. The surface is level and the soil a fertile sandy loam. The productions in 1850 were 825,622 bushels of Indian corn, 173,871 of wheat, 226,918 of oats, 190,745 of potatoes, 27,882 tons of hay, and 399,097 lbs. of butter. There were 15 grist and 16 saw mills, 2 newspapers, 41 churches, and 3,263 pupils attending public schools. Marl abounds, and iron ore is found. A canal 4 m. long connects Salem creek with the Delaware. Capital, Salem.

SALEM, a city, port of entry, and one of the shire towns of Essex co., Mass., situated principally on a tongue of land lying between two friths or arms of the sea, called North and South rivers, 14 m. N. by E. from Boston, with which it is connected by the eastern railroad; lat. 42° 31' 18" N., long. 70° 53' 53" W.; pop. in 1860, 22,252. The city occupies the whole peninsula, which is about 2 m. long and  $\frac{1}{2}$  m. broad. A smaller peninsula called the Neck is attached to it, and was first inhabited; a large portion of it belongs to the city, and is occupied as the almshouse farm. A bridge across the North river connects the city with Beverly. The site of that part of the city within the peninsula is flat, but healthy; the streets are irregular, but well built, many of the houses of brick or stone. Chestnut street is considered the finest in the city; it has a row of noble elms on each side, and many elegant residences. In the E. part of the city, toward the end of the peninsula, is a beautiful park or "common" of 8 $\frac{1}{2}$  acres; in the other portions the surface is more uneven. There are 21 churches, some of them of considerable architectural beauty. Among the principal public institutions is the East India

marine society, formed of those who, as captains or supercargoes, have doubled Cape Horn or the cape of Good Hope. The museum of this society is one of the most interesting and valuable in the country, consisting of curiosities of nature and art from almost every part of the world. The Essex institute, organized in 1848 by the union of the Essex historical society and the Essex county natural history society, has a library of 18,000 volumes, an extensive cabinet of natural history, a large collection of portraits of the past officers and of the old worthies of Essex county, and also many articles illustrative of the habits and costumes of the olden times and of foreign climes. The Salem Athenæum, formed in 1810, by the purchase of the social and philosophical libraries as a basis, has a library of 12,500 volumes. These two last named institutions occupy the fine building known as Plummer hall, erected from funds bequeathed to the Salem Athenæum by the late Miss Caroline Plummer. The Essex agricultural society has also a good library of agricultural works, and there are several smaller public libraries, as well as many private ones of great value. The schools of Salem have for years had a high reputation. One of the state normal schools is established here. There are also a classical and high school, 5 grammar and 10 intermediate and primary schools, attended by 2,539 pupils, and several excellent private schools. The total amount expended for ordinary school purposes during the year 1860 was \$28,000. There are 5 newspapers in the city. —Salem has always been noted for its commerce. In its very infancy its inhabitants not only engaged in the fisheries and the coasting trade, but, in small vessels of 40 to 60 tons, crossed the Atlantic and prosecuted a trade with Spain, Italy, France, and the islands of the West Indies. In the revolutionary war 158 privateers, mounting at least 2,000 guns, and carrying not fewer than 6,000 men, were fitted out from the town of Salem alone. These vessels captured 445 prizes, and brought  $\frac{1}{10}$  of them into port in safety. In 1785 the first vessel ever sent from this country, to the isle of France, Calcutta, and China, was despatched by Elias Haskett Derby of Salem, and was followed by many more from that town, which for years held almost the entire monopoly of that trade, having in 1818 54 vessels engaged in it. The trade to the other ports of the East Indies and Japan was also commenced by the merchants of Salem, as was that to Madagascar and Zanzibar, and the other gum and ivory ports of E. Africa, the legitimate trade to the ports of W. Africa, the commerce with Brazil and the Amazon, and especially the India rubber trade, in which for many years she took the lead. In the South sea, Salem ships were the first to visit the Feejee islands. New Holland, New Zealand, and the N. W. coast were also first opened to our commerce by them. The commerce of Salem is now less extensive than in the early part of the century, the great seaboard

cities having absorbed much of it. In 1860 the enrolled and licensed vessels of the city amounted to 27,538 tons; the arrivals for the same year were 265 vessels, of 81,826 tons; and the clearances were 265 vessels, of 82,978 tons. The exports of the port in 1860 amounted to \$1,528,345, and the imports to \$1,377,869. —The manufactures of Salem are of considerable importance. The principal establishments are a cotton mill, running 65,000 spindles; a laboratory, manufacturing chemicals to the amount of \$100,000; a large establishment for refining copal; tanning and currying works producing \$1,500,000 worth of leather, and shoe factories turning out \$100,000 worth of shoes; manufactories of machinery, cordage, twine, oil, candles, and black and white lead. There are 7 banks, with an aggregate capital of \$1,865,000, 2 savings banks, and 5 insurance companies. Salem is connected with Boston by 2 railroads, and 4 others connect it with Marblehead, Cape Ann, Lawrence, and Lowell. An aqueduct supplies it with excellent spring water. —Salem is the oldest town in New England, except Plymouth, having been settled in 1626. In 1629, 11 ships arrived here from England, bringing 1,500 immigrants, who settled in various localities in the vicinity. The first church organization effected in this country was at Salem in 1629, with the Rev. Francis Higginson as its pastor. In 1692 the famous "witchcraft" delusion made its appearance, and 19 persons from this and adjacent towns were condemned and executed on the eminence now known as "Gallows hill." It had its origin in what is now the town of Danvers, and the persons connected with it, as accusers, witnesses, or victims, belonged to several other towns also. (See WITCH.) The town was incorporated in 1630, and received city privileges in 1836. Its Indian name was Naumkeag.

SALEM, a province of British India, Madras presidency, bounded N. by Mysore and North Arcot, E. by South Arcot, S. E. and S. by Trichinopoly, and S. W. and W. by Coimbatore and Mysore; area, 7,499 sq. m.; pop. 1,195,377. It is subdivided into the districts of Salem and Barramah, the latter of which is hilly. The principal river is the Cavery. Artificial sheets of water or tanks for purposes of irrigation are numerous. Iron ore is abundant, and mines of chromate of iron have been extensively worked at the foot of the Sheevaroy hills. Cotton is extensively cultivated. —Capital, SALEM, 170 m. S. W. from Madras; pop. 19,020. Silk and cotton are manufactured.

SALEP, a mucilaginous nutritive substance prepared from the dried bulbs of the *orchis mascula* and other species of the same genus. The plants grow in various parts of S. Europe and N. Africa. The bulbs when taken up are stripped of their epidermis and plunged in boiling water or dried in an oven, after which they are strung together in bunches. In drying they form small, oval, irregular masses, hard, horny, semi-transparent, of a yellowish color, feeble odor, and mild mucilaginous taste. It is used



in a powdered state, in which it is also sometimes kept. To pulverize it, the dry, hard bulbs are macerated in cold water till they become soft, when they are immediately dried. In water it swells like gum tragacanth, and yields like it a small portion soluble in the water, and minute quantities of saline matters. It contains a little starch, and possesses highly nutritive properties, resembling sago and tapioca. The countries about the upper Mediterranean and Persia formerly alone supplied it, but it is now produced in France also.

**SALERNO** (anc. *Salernum*), a fortified seaport town of S. Italy, capital of the province of Principato Citra, at the head of the gulf of Salerno, 30 m. S. E. from Naples; pop. in 1850, 18,852. It stands upon the side and at the foot of a hill. The cathedral, dedicated to St. Matthew, whose body according to tradition is buried within the walls, was founded in 1084. A Roman colony was formed at Salernum in 194 B. C. After the fall of the Romans it became the capital of a flourishing republic. It fell into the hands of the Saracens in 905, from whom it was captured by the Greeks, and was subsequently recovered by the Lombards. The Normans obtained possession of it in 1076, and made it the capital of their possessions in S. Italy. The town was almost entirely burned down by the emperor Henry VI. in 1198, but it afterward recovered, and eventually was merged in the kingdom of Naples.

**SALES, FRANCIS DE.** See **FRANCIS DE SALES.**

**SALIANS**, or **SALIC FRANKS**, a tribe of Germans, who were originally settled upon the right bank of the Rhine, and who under Clovis invaded Gaul toward the end of the 5th century, and by the conquest of that country founded the French monarchy. Their code of law was called the *Salic*. (See *CODE*, vol. v. p. 427.)—*Salic land* (*terra Salica* or *dominicata*) was a name given to an estate subject to no burden, depending upon no superior, and upon which the manor house of the master was situated. Later the title was applied also to inherited landed property as distinct from acquired possessions, and by the Salian law females were excluded from inheriting this species of property. This last feature of their law has always prevailed in France with respect to the crown, as it did in Spain under the Bourbon line till 1830, when it was abolished in favor of the present queen. The German emperors of the house of Franconia, from Conrad II. to Henry V. (1024–1125), are designated by historians as *Saliens*.

**SALIO LAW.** See **SALIANS.**

**SALINE**, a river of Arkansas, rising in the N. part of Saline co., and flowing in a S. E., S., and S. W. direction into the Washita river. Its length is about 200 m.

**SALINE.** I. A central co. of Ark., drained and partly bounded on the W. by Saline river; area, 950 sq. m.; pop. in 1860, 6,640, of whom 749 were slaves. The surface is level in the S. part and hilly in the rest of the county, and

the soil is productive. The productions in 1850 were 185,805 bushels of Indian corn, 14,190 of sweet potatoes, 1,287 bales of cotton, and 29,355 lbs. of butter. There were 4 tanneries, 15 churches, and 500 pupils attending public schools. Marble, quartz, and soapstone are found in large quantities. Capital, Benton. II. A S. E. co. of Ill., intersected by branches of Saline creek; area, 370 sq. m.; pop. in 1860, 9,331. The surface is generally level and well timbered, and the soil fertile. The productions in 1850 were 341,900 bushels of Indian corn, 25,858 of oats, 15,558 of potatoes, and 113,650 lbs. of tobacco. There were 12 churches, and 410 pupils attending public schools. Capital, Raleigh. III. A central co. of Mo., bounded N. and E. by the Missouri river, and intersected by the Black and Salt forks of La Mine river; area, 750 sq. m.; pop. in 1860, 14,700, of whom 4,876 were slaves. The surface is mostly prairie and the soil fertile. The productions in 1850 were 539,030 bushels of Indian corn, 42,146 of wheat, 65,347 of oats, 2,595 tons of hay, 100,450 lbs. of butter, 287,533 of tobacco, and 20,583 of wool. There were 15 grist and 6 saw mills, 11 churches, and 1,057 pupils attending public schools. Bituminous coal, lead, limestone, and sandstone are found; and there are numerous salt springs. Capital, Marshall. IV. A S. W. co. of Nebraska territory drained by Big Blue river and Turkey creek; pop. in 1860, 29.

**SALISBURY**, or **NEW SARUM**, a town of England, capital of Wiltshire, situated at the junction of the Avon, Wily, and Bourne rivers, 82 m. W. S. W. from London; pop. in 1851, 11,657. The cathedral was built between 1220 and 1258, by the bishop and canons of Old Sarum, 2 m. N., which place was in consequence deserted by its inhabitants for the new site. The extreme length of the cathedral, which is Gothic, is 474 feet, breadth 230; height of the exterior 115 feet, and of the spire 404. The principal manufacture is cutlery. The woollen manufacture, for which the town was once famous, has become extinct. It returns two members to parliament.

**SALISBURY, EARL OF.** See **CECIL.**

**SALIVA.** See **DIGESTION**, and **PAROTID GLAND.**

**SALLE, JEAN BAPTISTE DE LA**, a French ecclesiastic, founder of the order of brethren of the Christian schools, born in Rheims, April 30, 1651, died at the institute of St. Yon, near Rouen, April 17, 1719. At the age of 17 he was appointed canon in the cathedral church of Rheims. He conceived the design of establishing a school for the instruction of teachers of girls' schools, and about 1681 purchased a house, where, out of school hours and during holidays, they spent their time in mutual conferences, in receiving instruction, and in religious exercises. Finding that his social position was a barrier between him and the poor schoolmasters, he distributed his patrimony among the poor. Finally, after a period of

fasting of 17 days, they organized themselves as an order for the gratuitous Christian education of the poor. (See BRETHREN OF THE CHRISTIAN SCHOOLS.) About 1688 it became necessary to reorganize the order, and La Salle established a novitiate at Vaugirard near Paris, where he lived in great poverty and privation for a number of years, the teachers of Paris opposing him bitterly, because his schools interfered with their emoluments. At Chartres, where he sent 6 of the brothers to open a large school, the schoolmasters of the commune procured an edict from the bishop forbidding them to take any but pauper children, and thus broke up the school. In 1699 he attached to his novitiate in Paris a Sunday school for apprentices and other young persons under 20 years of age, in which instruction was given in reading, arithmetic, and drawing, as well as in the catechism and Bible history. This roused the bitter opposition of the Parisian teachers, and after 6 years' effort they succeeded in breaking it up. In 1702 he established a house of his order in Rome, in 1703 in Avignon, in 1704 in Marseilles, and in 1705 in Rouen; and soon after he removed his novitiate to St. Yon. In 1716 he resigned his office as superior of the community, and devoted his last years to the instruction of a class of little children.

SALLET, FRIEDRICH von, a German poet, born at Neisse, Silesia, April 20, 1812, died at Reichau, near Nimptsch, Feb. 21, 1843. He was received in 1824 into the corps of cadets at Potsdam, and in 1829 was sent as lieutenant to Mentz. Becoming disgusted with his position, in 1830 he gave vent to his feelings in a satirical novel of military life, for which a court martial sentenced him to be imprisoned 10 years and cashiered; but the king commuted the term of punishment to 2 months. Abandoning military life, he settled at Breslau in 1838, and gave himself up to literary labors, in his later years becoming wholly absorbed by philosophical and religious speculations. The most important of his poems is the *Laien-evangelium* (Breslau, 1839), which at the time of its appearance made a great sensation. It is an enthusiastic eulogy of pantheism, the deification of man being represented as the highest aim of Christianity. In *Die Atheisten und Gottlosen unserer Zeit*, published posthumously (Leipzig, 1844), the pietists are declared to be genuine atheists. His complete works were published at Breslau (5 vols., 1845).

SALLUST (CAIUS SALLUSTIUS CRISPUS), a Latin historian, born at Amiternum, in the country of the Sabines, in 86 B. C., died in 34 B. C. He belonged to a plebeian family, and about the age of 27 obtained the quaestorship. In politics he allied himself with the faction of Cæsar, and in 50 was expelled from the senate by the censors Appius Claudius and Piso on the ground of adultery with Fausta, the daughter of Sylla, but in reality, probably, on account of his vigorous opposition to the aristocratic party. In 52 he was elected a tribune

of the people, in 47 prætor, and in 46 he accompanied Cæsar in his expedition to Africa. He was appointed governor of Numidia, and, after acquiring an immense fortune by plundering the inhabitants, retired into privacy, devoting the remainder of his life to literary pursuits and the embellishment of his splendid gardens on the Quirinal hill. His character has been drawn in the darkest colors by Dion Cassius and other authors, who ascribe to him almost every species of profligacy and crime, though he was probably no worse than most of the contemporary Roman politicians. His literary productions consist of the *Bellum Catilinæ*, a history of the conspiracy of Catiline; the *Bellum Jugurthinum*, a history of the war against Jugurtha; and *Historiarum Libri V.*, comprising the period between 78 B. C., the year of Sylla's death, and 66 B. C., and forming, with the other two works, a connected history of Roman affairs for 45 years. It exists only in a few fragments, but of the "Jugurthine War" and the "Conspiracy of Catiline" numerous editions have appeared, the first being that of Venice (fol., 1470), and the best those of Kritz (2 vols. 8vo., Leipzig, 1828-'34) and of Gerlach (3 vols. 4to., Basel, 1823-'31), the latter containing, in addition, the fragments of the lost books. There are no fewer than 15 translations of Sallust into English, the oldest by Barclay (1511), the most recent by Watson (1852). Sallust seems to have taken Thucydides as a model, and his narrations are remarkable for conciseness and perspicuity.

SALMASIUS, OLAUDIUS (CLAUDE DE SAUMAISE), a French scholar, born near Sémur, in Auxois, April 15, 1588, died at Spa, Sept. 6, 1653. At the age of 10 he wrote Greek and Latin, and read Pindar fluently. At the age of 16 he went to Paris to complete his studies, and there made the acquaintance of Casaubon, under whose influence he embraced Protestantism. From Paris he went to Heidelberg, where he formally renounced the Roman Catholic religion. He afterward returned to France, and resided for several years near Paris. He was invited by the Venetians, by the university of Oxford, and by the pope, and at length in 1632 settled at Leyden upon a public salary, with the title of honorary professor in the university. In 1640 he returned to France on the occasion of his father's death, and while there was pressed by Richelieu to remain. He went back to Leyden, however, but afterward removed to Sweden upon the invitation of Queen Christina, returning to Holland in the following year. Upon the execution of Charles I. of England, Charles II., who was then in Holland, employed Salmasius to write a defence of his father and of monarchy, which was published under the title of *Defensio Regiæ pro Carolo Primo* (Leyden, 1649). The English council of state in 1650 ordered "that Mr. Milton do prepare something in answer to the book of Salmasius," and the result was Milton's famous *Defensio pro Populo Anglicano*. The chagrin

of Salmasius at the loss of credit which followed is thought to have finally caused his death. Of his numerous works the most important is *Pliniana Exercitationes in Cuii Julii Solini Polyhistora* (2 vols. fol., Paris, 1629). A collection of his letters was published in 1656.

SALMON, the common name of the soft-rayed fishes of the genus *salmo* (Ouv.). The old genus *salmo* of Artedi and Linnaeus has been subdivided into the three principal families of *salmonida*, *characini*, and *scopelida*, of which only the first concerns us here; this, beside the salmon and trout, includes the smelt, capelin (*mallotus*), grayling, whitefish, and others. The genus *salmo* has the cheeks or whole head covered with scaleless integument, and the rest of the body with cycloid, thin, small scales; there is an adipose fin on the back near the tail, over the anal, and the dorsal is over the ventrals; the branchiostegal rays vary from 12 to 19, and there is a false gill on the inner side of the operculum; the edge of the upper jaw is formed by the maxillaries as well as the premaxillaries; the air bladder is always present, large and simple, opening into the pharynx; the intestinal canal is short, with numerous pyloric caeca; the ovaries form closed sacs without oviducts, and the eggs enter the cavity of the abdomen, whence they pass out by an opening behind the anus. The names salmon and trout have been applied in the most indefinite and contrary manner, by different authors and in both hemispheres, to the fishes of this genus; those by almost universal consent called salmon will be alluded to here, leaving for the article Trout the brighter spotted, and usually smaller and fresh water species. Even the genus as restricted by Cuvier has been subdivided into 3 by Valenciennes according to the distribution of the vomerine teeth; in *salmo* (Val.) there are strong conical teeth in both jaws and a small group at the end of the vomer; the palatine bones and the sides of the tongue are also armed with teeth; in *fario* (Val.), including the salmon trout, there is in addition a single mesial line of teeth on the vomer; and in *salar* (Val.) the vomer has 2 rows of teeth. Species called salmon and species called trout are found in each of these subdivisions, but the last 2 contain chiefly those called salmon trout and trout. The salmon is of great importance to man as an article of food, and are the most esteemed of any fresh water fish; the number of men and the amount of capital employed in this fishery are very great; their flesh is eaten fresh, salted, smoked, dried, and pickled, and is always much esteemed. The species, which are numerous, inhabit the sea and fresh waters, some migrating from the ocean to rivers at the breeding season; they spawn in shallow streams, both sexes assisting in forming the bed; they are found in the northern waters of Europe, Asia, and America, even in small streams, in the cold water of the arctic zone, and as high as the regions of per-

petual snow; none have been found in South America, the East Indies, or Africa. Though not mentioned by ancient Greek authors, they are unmistakably alluded to by Pliny and Ausonius among the Latins.—At the head of the true salmon, or those having the body of the vomer smooth, stands the common salmon (*S. salmo*, Val.; *S. salar* of authors). In this the head is large, the gape wide and well furnished with teeth; the gill openings are very large, and consequently death very soon takes place out of the water; the abdominal outline is much more curved than the dorsal; the snout pointed, and the body rather slender and fusiform; the form is elegant, and the movements rapid and vigorous. The color is slaty blue on the back, darkest on the head, duller and slightly silvery on the sides, and beneath pearly silvery white; there are numerous black spots above the lateral line; the dorsal, pectorals, and caudal are dusky, the anal white, and the ventrals white externally and dusky internally; the gill covers are rounded posteriorly, and the tail is nearly square in the adult, but forked in the young; the scales are delicate, and sunk in the thick and fatty skin. As seen in the markets they are generally not more than 8 feet long, though they attain a much larger size. From the northern seas they enter the rivers when swollen by the rains and more or less turbid and deep, remaining for a time in the brackish estuaries; they are probably able to detect the mixture of the waters through the nostrils, which are freely supplied with nervous filaments; they ascend during the flood, at the rate of 15 to 25 miles a day, resting in pools when the water is unfit for their progress; the females ascend before the males. Having attained the requisite height, as the cold weather comes on they take measures to deposit their spawn; at this time the female becomes very large, and her silvery tints dull gray; the male becomes thinner on the back, the nose longer, the under jaw turns up in a strong hook which enters a hollow in the nose, and the colors become brown and red. A furrow, 6 to 9 inches deep, is excavated in the bottom, principally by the female; in this the spawn is deposited, impregnated, and covered with gravel by the fish. The sexes have been seen to come together, and to shed the spawn and sperm at the same time; the spawning process consumes from 8 to 12 days, and at the end of it the fish are very much emaciated, the breeding colors and other characters are lost, the scales are cast off, and they retire to some quiet place to regain their strength; in this condition they are called kelts, and are then unfit for food; after this they go back slowly to the sea, where they soon recover their perfect condition. The eggs remain covered by the gravel all winter beneath the ice, and begin to be hatched by the end of March or commencement of April; experiments prove that the eggs are hatched in 114 days when the temperature of the water is at 86° F., in 101 at 48°, and in 90 at 45°.

The young come out from the gravel when about an inch long; these are called parr, and remain a year in fresh water; when 4 to 6 inches long they receive the name of smolts, and are greenish gray above and silvery below, with very deciduous and delicate scales, in which state they descend to the sea; after about 2 months' sojourn there they ascend the rivers again, weighing 2½ to 4 lbs., and are then called grilse; they spawn during the winter, and then are entitled to the name of salmon; descending and returning the following season, they weigh 10 to 15 lbs., and may go on increasing to 60 or 70 lbs.; but now a salmon of 80 lbs. is considered a very large fish, as from the injudicious methods of fishing both in Europe and this country most are caught in the condition of grilse or even younger. According to Dr. Davy, the eggs retain their vitality for many hours in the air, if moist and cold (even to 32° F.), but not more than an hour if dry and at ordinary temperatures; both the ova and young fish will bear a heat of 80° or 85° in water for a short time, but die in water above 84° or 85°; they perish also in salt or tolerably brackish water. In their descent to the sea they generally remain for a time in brackish water, by which they get rid of their fresh water parasites (crustaceans which attach themselves to their gills), and they do the same thing before they ascend the rivers, which frees them from marine parasites. This species is very extensively distributed in northern Europe and America, being found in Great Britain, the Orkneys, France, Belgium, Holland, Germany, Russia, Denmark, Sweden, Norway, Iceland, getting access from the English channel and the northern seas by the Tweed, Tay, Severn, Loire, Rhine, Elbe, &c.; it does not occur in rivers falling into the Mediterranean, and does not come below the 45th parallel of latitude; in North America it frequents the rivers of Labrador, Canada, Newfoundland, Nova Scotia, New England, and those of New York communicating with the St. Lawrence, ascending even to Lake Ontario. Salmon can live without access to the sea, as is seen in Sebago and other landlocked lakes of Maine, but they are of inferior size and quality. It is well known that the salmon has the power of swimming with great velocity, of stemming rapid rivers, and of jumping over dams and waterfalls of considerable height when they impede their ascent of a chosen river; they have been known to spring 14 feet out of water, and to describe a curve of at least 20 feet in order to surmount a cascade; if not successful at first they persevere till they succeed, unless the obstruction be insurmountable; these efforts they are able to make by their powerful and active muscles, and especially by the strong and fleshy tail. Ascending the rivers from June to September, their shoals are attended by porpoises, seals, and carnivorous fish, which find them an easy prey; it is popularly believed that they return to the

river in which they were hatched, which in their immense numbers would be likely to happen to some, but more unlikely, as the fact proves, to the greater portion. The salmon is very voracious, and grows rapidly; in the sea it feeds principally on small fishes, especially the sand eel (*ammodytes*), crustaceans, the ova of echinoderms, &c.; it is believed that it eats very little while in fresh water from its thin appearance, but the emaciation would be sufficiently accounted for by the waste incidental to the breeding season. In the sea salmon very rarely bite at a hook, but in rivers and estuaries they will rise to artificial flies. For an interesting account of salmon fly fishing the reader is referred to Sir Humphry Davy's "Salmonia, or the Days of Fly Fishing." They are taken by spearing by the American Indians, and also in the Scottish rivers; for the latter see Sir Walter Scott's "Red Gauntlet" and "Guy Mannering." Where salmon fishing is pursued as a business, they are taken in nets, usually in gill nets, stretched across the mouths of the rivers which they enter. Many hundred salmon of good size are often taken at a single haul of a seine, and some of the English fisheries furnish annually more than 200,000 fish; the fisheries of Scotland and Norway are also very profitable. Rivers are let out to sportsmen with the exclusive right of fishing for salmon; the streams of the British provinces in America are frequently thus disposed of both to native and foreign anglers. The river Thames was once celebrated for its salmon, but its stream is now too impure to invite them to enter; the Merrimack river in Massachusetts a few years ago swarmed with salmon weighing from 9 to 12 lbs., but the numerous dams and manufacturing establishments have since driven them away, and the northern markets are now supplied from the Kennebec river and the British provinces; the fishery in the gulf of St. Lawrence is estimated as worth \$500,000 a year, and with the present steam communication the fish can be delivered in Boston, New York, and Philadelphia, in as good condition as those from Scotland in the London and from the English channel in the Paris markets. The flesh is exceedingly delicate, and of a tint of pink which has received therefrom the name of salmon-colored; the delicacy of the flesh is no doubt due to the ova of echinoderms and crustaceans which form their chief food, and the intensity of the red color seems to be in proportion to the quantity of the *gammarina* (minute amphipod crustaceans) which they devour. As with all fish which swim near the surface, the flesh should be eaten when fresh, as the flavor is lost rapidly after death. The price varies in our markets from 20 cents to \$2 a pound, according to season and the amount caught; specimens have been sold in Boston weighing 30 and 35 lbs. The salmon enters the rivers of Nova Scotia in the latter part of April, the rivers from the bay of Fundy a month later, and those from the gulf of St.

Lawrence in June; the females arrive first, and the males about a month after, and the grilse ascend during July and August. They spawn late in autumn, most of them returning to the sea before the rivers are frozen over, but some remaining in fresh water all winter and going to the sea in the spring; the ova are cast when the water is at most at 42° F., in shallow, pure, and rapid streams. Among the noted rivers for fly fishing are the Gold and St. Mary's in Nova Scotia, and the S. W. Miramichi and Nepisiguit in New Brunswick.—The *S. hamatus* (Ouv.), regarded by Bloch and other naturalists as the old male of the preceding species, has the back reddish gray, the sides brighter, and lower parts dull white; there are black spots above the lateral line, and some red markings, and the fins are bordered with blackish; the lower jaw in both sexes and in the young has a terminal hook turned upward and received in a depression near the union of the intermaxillaries; the mouth is very large from the elongation of the jaws, and is armed with strong teeth. The true salmon enters the rivers in summer, but this species ascends between October and the end of February, so that the two are not found together except at the end of the fishing season; the flesh is lighter colored and drier than in *S. salar*, and is hence less esteemed; it is found in the rivers of western Europe, but a specimen so named by Agassiz was caught in 1860 in the Merrimack river, showing that species which generally leave their arctic retreats for the European shore sometimes descend on the American coast. In the *S. hucho* (Val.), the salmon of the Danube, the body is longer and rounder than in the common salmon; it is grayish, approaching to violet, on the back, silvery white on the sides and below, the head and dorsals with a greenish tint, and the other fins yellowish; above the lateral line are black spots, smallest in the largest fish; as in other salmons, the young have 7 or 8 dark vertical bands on the body, which disappear with age; it attains a weight of 30 or 40 lbs., and is not found in the rivers opening into the Baltic; the flesh is white, but softer and less agreeable than in the common species; the spawning season is in June. For other species of old world salmon, see Cuvier and Valenciennes' *Histoire naturelle des poissons*, vol. xxi. Among the American species the arctic salmon (*S. Rossii*, Rich.) deserves mention; it grows to a length of 2 or 3 feet, and has a more slender form than the common salmon; the color above is brownish green, the sides pearly gray with bright red dots near the lateral line, and red below; the under jaw is considerably the longer; the scales small, and separated from each other by smooth skin; it is found in the arctic seas and in the rivers therewith communicating so abundantly, that over 3,000 were taken at a single haul of a net during one of the expeditions of Sir John Richardson. Many other species of the arctic seas, on the east and west coasts of

North America, are described and figured in Richardson's "Fauna Boreali-Americana."

SALMON TROUT. See TROUT.

SALOMON ISLANDS. See SOLOMON ISLANDS.

SALONICA, or SALONIKI (anc. *Therma*, and afterward *Thessalonica*), a walled town of Turkey in Europe, situated on a small island of the same name at the head of the gulf of Salonica, anciently called the Thermaic gulf, 315 m. W. S. W. from Constantinople; pop. about 70,000. It is built on the slope of a steep hill. One of the mosques was originally a temple of the Thermaean Venus, and was afterward used as a Christian church till it fell into the hands of the Mohammedans. A triumphal arch at the W. extremity of the Via Egnatia is believed to have been erected by the people of Thessalonica in honor of Augustus Cæsar, and in memory of the battle of Philippi; it is 12 feet wide and 18 feet high, and is constructed of large blocks of marble. Another arch is built of brick faced with marble, has camels sculptured on it, and is supposed to commemorate the victory of Constantine over the Sarmatians. The castle by which the town is defended is partly Greek and partly Venetian. Woollen and silk goods and hardware are manufactured. In 1856 the value of the exports was \$7,003,500, and of the imports \$5,509,000; and during the same year 659 vessels of an aggregate of 101,680 tons entered the port. The surrounding country is exceedingly beautiful.—Salonica was called Therma from the hot springs near it. In 315 B. C. it was enlarged by Cassander, who named it Thessalonica after his wife, the daughter of Philip. Xerxes rested his army here. It was occupied by the Athenians in 421 B. C., and afterward became the chief Macedonian naval station. It surrendered to the Romans after the battle of Pydna, and under the empire it was the capital of the Illyrian provinces. Cicero took refuge here during his exile. It took a prominent part in the Gothic and Slavic wars, but was captured by the Saracens in 904, when the population amounted to 220,000. The Normans from Sicily took it in 1185. It was held during the first half of the 13th century by Boniface of Montferrat, and afterward by the Venetians. It was finally captured by the Turks in 1430.

SALPIANS, a group of acephalous mollusks of the order *tunicata*. See MOLLUSCA.

SALSETTE, an island of British India, in the presidency of Bombay, separated by narrow channels from the island of Bombay on the S., and from the mainland on the N. and E.; length S. W. and N. E. 18 m., breadth 10 m.; area, about 150 sq. m.; pop. estimated at 50,000. The island is connected with that of Bombay by an arched stone bridge and by a causeway built at the joint expense of Sir Jamsetjee Jejeebhoy and the government. The hill of Keneri in the centre commands an extensive view in all directions, and has several ancient rock-cut cave temples, as also have other

parts of the island. The chief town is Tannah, which gives its name to the district to which the island belongs. Salsette came into possession of the Portuguese soon after their arrival in the country, and was wrested from them in 1739 by the Mahrattas, who in turn were dispossessed by the British in 1774.

**SALSIFY.** See OYSTER PLANT.

**SALT**, the chloride of sodium, a natural compound of one atom of chlorine and one of sodium, represented by the formula  $\text{Na Cl}$ ; chemical equivalent 58.5. It occurs as a rock interstratified with marls, sandstones, and gypsum, and as an element of salt springs, sea water, and salt water lakes. It is the only mineral substance universally required as an article of food by man and the higher orders of

the animal kingdom, and its distribution is so general that it is almost everywhere accessible. The proportions of its elements are 60.4 per cent of chlorine and 39.6 per cent. of sodium. The chief impurities found in rock salt are sulphate of lime, oxide of iron, and clay; but beside these the chlorides of potassium, calcium, and magnesium, the sulphates of soda and magnesia, and bituminous matters are occasionally met with, and some varieties are even colored by the presence of infusoria. In salt made from sea water, the salts of magnesia with a little sulphate of lime are the principal impurities. All the varieties of salt occasionally contain minute quantities of bromides and iodides. The following table exhibits the composition of salt from various sources:

Varieties of salt.	Chloride of sodium.	Chloride of potassium.	Chloride of calcium.	Chloride of magnesium.	Sulphate of potash.	Sulphate of lime.	Sulphate of magnesia and soda.	Carbonates.*	Alumina and iron.	Residue.	Water.	Percentage of saline residue.	Authorities.
<b>ROCK SALT.</b>													
Wieliczka, white.....	100.00	.....	.....	trace	.....	.....	.....	.....	.....	.....	.....	.....	Bischof.
Berchtesgaden, yellow.....	99.928	.....	.....	0.07	.....	.....	.....	.....	.....	.....	.....	.....	"
Hall in the Tyrol.....	99.43	.....	0.25	0.12	.....	0.20	.....	.....	.....	.....	.....	.....	"
Stassfurth.....	94.57	.....	.....	0.97	.....	0.80	.....	.....	1.12	2.23	0.22	.....	Heine.
Hallstadt in Upper Austria.....	98.14	trace	.....	.....	.....	1.86	.....	.....	.....	.....	.....	.....	Bischof.
Vic in France.....	99.80	.....	.....	.....	.....	0.50	.....	.....	0.20	.....	.....	.....	Berthier.
Djeb-el-Melah, Algeria.....	97.00	.....	.....	.....	.....	3.00	.....	.....	.....	.....	.....	.....	Fournet?
Ouled Kebbah, Algeria.....	98.53	.....	0.93	0.54	.....	.....	.....	.....	.....	.....	.....	.....	Fournet.
Holston, Virginia.....	99.55	.....	trace	.....	.....	.....	.....	0.45	.....	.....	.....	.....	C. B. Hayden.
Cheshire, England.....	99.52	.....	.....	0.02	.....	0.46	.....	.....	.....	.....	.....	.....	G. H. Cook.
Carrickfergus, Ireland.....	96.23	.....	.....	.....	.....	8.50	0.08	.....	.....	.....	0.14	.....	"
<b>SEA SALT.</b>													
Turk's Island.....	96.76	.....	.....	0.14	.....	1.56	0.64	.....	.....	.....	0.90	.....	G. H. Cook.
St. Martin's.....	97.21	.....	.....	0.26	.....	0.54	0.24	.....	.....	.....	1.75	.....	"
St. Kitts.....	99.77	.....	.....	0.01	.....	0.08	.....	.....	.....	.....	0.14	.....	"
Curaçoa.....	99.35	.....	.....	0.03	.....	0.12	.....	.....	.....	.....	.....	.....	"
Cadiz.....	95.76	.....	.....	0.57	.....	0.73	0.48	.....	.....	.....	2.44	.....	"
Lisbon.....	94.17	.....	.....	1.11	.....	0.49	1.89	.....	.....	.....	2.84	.....	"
Trapani, Sicily.....	96.73	.....	.....	0.49	.....	0.41	0.63	.....	.....	.....	1.64	.....	"
Martha's Vineyard.....	94.91	.....	.....	0.24	.....	1.42	0.19	.....	.....	.....	3.24	.....	"
Texas.....	99.46	.....	.....	.....	.....	0.10	0.80	.....	.....	.....	0.14	.....	"
<b>SALT FROM SPRINGS AND LAKES.</b>													
Cheshire.....	96.86	.....	0.01	0.02	.....	1.17	.....	.....	.....	.....	2.44	.....	G. H. Cook.
Dieuze.....	97.59	.....	.....	.....	.....	1.02	0.89†	.....	.....	.....	0.50	.....	"
Droitwich.....	96.93	.....	.....	0.02	.....	8.05	.....	.....	.....	.....	.....	.....	"
Onondaga.....	97.41	.....	0.15	0.13	.....	1.26	.....	.....	.....	.....	1.00	.....	"
Pittsburg.....	96.70	.....	0.53	0.07	.....	.....	.....	.....	.....	.....	2.70	.....	"
Kanawha.....	91.31	.....	1.26	0.43	.....	.....	.....	.....	.....	.....	7.00	.....	"
Holston.....	99.11	.....	.....	.....	.....	0.63	0.11†	.....	.....	.....	0.10	.....	"
Great Salt lake.....	97.61	.....	.....	.....	.....	1.08	0.08	.....	.....	.....	1.25	.....	"
Elton lake.....	98.95	.....	.....	0.19	.....	0.51	0.85†	.....	.....	.....	.....	.....	Göbel.
<b>SOLID RESIDUE OF BRINES AND SEA WATER.</b>													
Halle in Prussian Saxony.....	94.43	0.21	1.08	1.69	.....	2.23	.....	0.89	.....	.....	12.23	.....	Meissner.
Stassfurth.....	94.49	.....	.....	0.99	0.34	2.50	1.20+	0.18	.....	.....	17.16	.....	Heine.
Schönebeck.....	95.71	0.03	.....	1.09	0.08	1.61	1.37	0.06	.....	.....	2.00	.....	Herrmann.
Artern, from bore in rock salt.....	93.85	0.45	.....	1.59	1.10	1.51	.....	.....	.....	.....	26.50	.....	Heine.
Dürrenberg.....	82.68	.....	.....	1.49	0.99	0.04	0.63+	0.17	6.77§	0.02	8.89	.....	"
Naubeim.....	82.23	1.63	6.74	1.18	.....	0.15	7.68	.....	.....	0.07	2.87	.....	Bromels.
Soden.....	86.01	1.81	.....	2.24	.....	0.65	8.79	.....	.....	0.50†	1.27	.....	Figuerd & Mialha.
Cheshire.....	97.40	.....	0.25	0.25	.....	1.90	.....	.....	0.20	.....	26.00	.....	Wm. Henry.
Dieuze.....	81.87	.....	.....	.....	.....	1.83	3.30+	.....	.....	.....	15.20	.....	G. H. Cook.
China.....	73.47	.....	17.92	8.97	.....	.....	.....	.....	.....	.....	21.20	.....	Boussingault.
Onondaga.....	95.42	.....	0.54	0.64	.....	8.09	.....	.....	0.01	.....	18.54	.....	G. H. Cook.
Pittsburg.....	81.27	.....	13.93	4.80	.....	.....	.....	.....	trace	.....	2.80	.....	"
Kanawha.....	79.45	.....	16.48	4.07	.....	.....	.....	.....	trace	.....	9.20	.....	"
Holston.....	99.89	.....	.....	.....	.....	1.22	0.39+	.....	.....	.....	26.40	.....	"
Salt lake, Texas.....	97.03	.....	.....	.....	.....	0.92	2.10+	.....	.....	.....	24.90	.....	"
Sea water.....	73.61	1.34	.....	8.56	.....	8.47	6.42+	0.27	.....	.....	8.74	.....	Usiglio.
Elton lake.....	18.15	0.79	.....	67.50	.....	.....	18.26+	.....	.....	.....	20.13	.....	Rose.
Dead sea.....	29.56	2.51	11.81	55.45	.....	.....	0.37	.....	.....	.....	26.42	.....	Booth & Munkie.
Great Salt lake.....	90.07	.....	.....	1.12	.....	.....	8.18+	.....	.....	.....	22.42	.....	J. D. Gale.

\* The carbonates are mainly of lime, except in the Holston rock salt, which contains magnesia only.—The brines of Naubeim, Onondaga, Kanawha, and many others, as well as sea water and that of the Dead sea, contain traces of bromides and iodides. The dry residue of sea water from the Mediterranean contains 1.47 per cent. of bromide of sodium.

† Sulphate of magnesia only.

‡ Sulphate of soda only.

§ Sulphate of alumina.

¶ Silicate of soda.

Salt crystallizes in the cubic system, and has a very perfect cubic cleavage, which generally displays itself even in the great masses of rock salt, parts of which however are frequently massive and granular, and rarely fibrous or columnar. The most characteristic peculiarity of the crystallization of salt, however, is the formation of the hopper-shaped crystals on the surface of a saline solution during evaporation. A single cube appears at first, which partially sinks in the liquid, and new cubes then form and attach themselves to its upper edge, till by a repetition of this process a hollow rectangular pyramid, sometimes of considerable dimensions, and with the apex downward, is finally produced. Crystals of this form occur in some salt mines, and casts of them in clay are found in the New York salt region and some other places. Salt has a specific gravity of 2.1 to 2.257, and a hardness between gypsum and calc spar. It is transparent to translucent, and its color varies from white to yellowish, reddish, bluish, and purplish. It is of all substances the most perfectly diathermanous or transparent to heat. Clear rock salt transmits 92 parts of heat out of 100, and even muddy salt transmits 65, while plate glass transmits only 24 parts. At 32° F. 100 parts of water dissolve 35.52 parts of pure salt; and at 229.5°, which is the boiling point of a saturated solution, only 40.35 parts are dissolved. This almost uniform solubility at all temperatures furnishes the means of separating it from many of the foreign salts with which it is associated in sea water and brine springs. The presence of small quantities of other salts, however, increases its solubility. Rock salt dissolves much more slowly, even in fine powder, than sea salt and that from springs, and the coarsely crystallized salt than the finer varieties. These differences are of economical importance, especially in the curing of provisions. In some cases meat is first treated with fine salt, which rapidly penetrates it, and when placed in the barrels is "capped" with rock salt or other coarse salt, which, slowly dissolving, keeps up a continual supply of saturated brine as the meat gradually absorbs salt. For the principle of its curative properties see *PETREFACTION*, and *PRESERVATION OF FOOD*. Salt is fusible at a red heat, and volatile at a still higher temperature. Its volatility is made use of in the process of "salt glazing" common earthenware. (See *POTTERY*.) Artificial crystals generally decrepitate when heated, from the presence of water mechanically entangled between their layers. Some specimens of rock salt from Wieliczka in Austrian Galicia decrepitate when dissolved in water, and disengage a gas which appears to have been retained under strong pressure between their layers. This gas is sometimes pure carburetted hydrogen, and sometimes a mixture of this with hydrogen and oxide of carbon.—Of the sources of supply of salt, beds of rock salt and brine springs occur in geological formations of almost every period. The New York springs

are in the upper silurian, and most of those of western Pennsylvania and Virginia, of Michigan, Ohio, Indiana, Illinois, and Kentucky, in the lower coal measures; most of the Russian mines and springs are in the permian; those of Cheshire in England, Ireland, eastern France, Württemberg, and many other parts of Germany, in different members of the triassic group; those of the Austrian Alps in oolitic beds; those of the Pyrénées and of Cardona in cretaceous rocks; while those of Wieliczka in Galicia, of Tuscany, and Sicily belong to tertiary strata. Salt is also found as a volcanic product. Its most invariable mineral associate is gypsum or hydrated sulphate of lime; in some places, as at Bex in Switzerland, this is replaced by anhydrite, or the same mineral without water; while polyhalite (a mineral consisting of sulphates of lime, magnesia, potash, and soda), bitumen, sulphur, and calc spar also frequently occur with it; and in many places, as in the wells in the coal formation, a copious discharge of carburetted hydrogen gas accompanies the flow of brine, and also jets of rock oil. (See *PETROLEUM*.) Little is understood of the origin of rock salt. Some beds, as those of Cheshire, appear to have been produced by the drying up of bodies of sea water cut off from the ocean, while in other cases, as at Bex, where the salt forms a perpendicular vein or dike, its origin is altogether obscure. Salt lakes are derived either from the partial drying up of isolated bodies of sea water, as the Dead sea, or by the evaporation of lakes without outlets, and fed by streams which have passed over beds of salt, or plains impregnated with it, as Lake Ooroomiah in Persia, and many of the lakes of South America. Saline incrustations, often overspread the surface of plains in Russia, India, the South American pampas, the region E. of the Rocky mountains, &c. The ocean, however, is the great source of salt, containing on an average 33.8 parts of salts in 1,000, of which 26.8 in 1,000 are common salt. The entire quantity of salt in the ocean is estimated by Schafhäütl at 3,051,342 cubic miles, or about 5 times the mass of the Alps. Its separation from brines and sea water is conducted in 3 distinct ways: 1, by evaporation by the heat of the sun in shallow reservoirs, principally practised with sea water in the southern temperate or tropical regions; 2, by artificial heat, in very long shallow pans, as in Cheshire, or in kettles, as at the Onondaga salines; 3, by exposing sea water to intense cold, when the ice formed is nearly pure, and a concentrated brine remains, which is afterward subjected to one of the first two processes. Weak brines are frequently brought to a certain strength by solar evaporation, and then finished by boiling; or more frequently they are pumped up into elevated reservoirs, and suffered to trickle over the surface of bundles of brush or thorns built up into walls, sometimes 30 to 50 feet high, and 5,000 feet long, fully exposed to the sun and wind; the great amount of surface



thus obtained causes the evaporation to go on very rapidly, and a few repetitions of the process bring very weak brines to suitable strength for boiling. This process is known as "graduation;" and the same effect is sometimes obtained by allowing the water to trickle over ranges of cords suspended perpendicularly. The 8d process is practised in northern Europe, and might probably be used with advantage on some points of our northern coast. Additional details of these processes will be found among the descriptions of particular localities. Rock salt is rarely sold as such, but is dissolved and recrystallized.—The uses of salt are numerous and important. Beside its direct consumption as food, enormous quantities are needed for preserving meats and fish, much is consumed for agricultural purposes, and given to cattle and sheep, and a very large amount is used in chemical operations, particularly in the manufacture of soda. This last process alone takes about 48,000 tons annually in France, and a single establishment near Glasgow uses 17,000 tons. The proportionate consumption of salt in different countries is very variable. In the United States it is estimated at 50 or 60 lbs. annually for each person, in Great Britain at 22, in France at 15 lbs. Neither animals nor plants will thrive when totally deprived of salt, though too much acts as a poison. Certain plants which grow at the seaside depend upon it, and are also found inland in the neighborhood of salt mines and lakes. In medicine salt is employed as a remedy for dyspepsia, as an emetic, and as a styptic; a spoonful of dry salt will sometimes check hæmorrhage of the lungs. Salt water baths, natural or artificial, are considered stimulating and tonic in their effects. Salt is alluded to in many passages of the Bible. All sacrifices offered in the temple were seasoned with it; new-born children were rubbed with it; Elisha employed it to sweeten the fountain of Jericho; it is mentioned as one of the things most necessary to life; it is used as a symbol of perpetuity and incorruption, of hospitality (as it still is in the East), and finally of barrenness and sterility, as in sowing the site of a destroyed city with salt. The allusion to "salt that had lost its savor" refers to the impure article collected from the borders of salt lakes, and which might be merely earthy matters almost entirely free from salt, though having some resemblance to it. From its necessity salt has in almost all countries been a favorite subject of taxation, and important political results have sometimes arisen from the extortions practised by the collectors, of which the histories of France and Hindostan furnish examples.—Excepting Norway, Denmark, and Holland, the European countries are all provided with salt to some extent from domestic sources, and even in some of these rock salt is imported and refined. The principal mines of rock salt are those of Wieliczka in Galicia; at Hall in the Tyrol, and along the mountain range through Aussee, in Styria, Ebensee, Ischl, and Hall-

stadt in Upper Austria, Hallein in Salzburg, and Reichenhall in Bavaria; in Hungary in the county of Mármaros; in Transylvania, Moldavia, and Wallachia; at Vic and Dieuze in France; at Bex in Switzerland; in the valley of Cardona and elsewhere in Spain; in the region around Northwich in Cheshire, England; near Carrickfergus, Ireland; and in the government of Perm in Russia. The principal salt springs are in Cheshire, Worcestershire, and Staffordshire, England; in Würtemberg and Prussian Saxony; and in northern Italy. Russia is almost the only country which derives much from salt lakes. France, Spain, Portugal, and Italy, with a number of the islands of the Mediterranean, are the principal producers of sea salt. England, Austria, France, Spain, Portugal, and Italy, with some of the Mediterranean islands, are the principal exporters of salt.—In Russia the supplies from mines, springs, and lakes are inexhaustible. Over the vast area of the permian group (covering upward of 800,000 sq. m.) salt is found, and in numerous localities is extensively and profitably worked. In the government of Archangel it is obtained by freezing sea water and evaporating the liquid residue by artificial heat. At Totma in the government of Vologda are extensive salt works. Perm produces about 120,000 tons annually from mines and springs; Orenburg also from the numerous salt lakes in the steppes. At the celebrated Elton lake in Saratov the salt waters are supplied by several small streams, and, being spread over a wide surface, are evaporated by the heat of the sun, and form a hard crust, which becomes several inches thick in the course of a season, leaving the lake in most parts dry. About 100,000 tons are annually obtained, and more than 10,000 workmen are employed in preparing and transporting it. In the adjoining government of Astrakhan salt lakes and pools are numerous, the largest, Lake Baskutchatskoe, E. of the Volga, being 12 m. long and 5 wide. The soil is in great part a mixture of mud, sand, and salt, and the whole province, which consists of two vast steppes, was probably at one time covered with salt water. In the Crimea large quantities of salt are produced from lagoons, supplying a great part of southern Russia. In 1841 the excise on Crimean salt amounted to about \$100,000, and in 1854 to \$260,476. The N. W. part of the Crimea is a vast plain, the soil of which is impregnated with salt. Notwithstanding this profusion of salt, Russia is obliged to import very largely, and during the Crimean war the price was exorbitant. In 1857, 52,158 tons were imported from England.—In Sweden, Carlstad at the N. of Lake Wener is said to produce salt, probably from springs, but both Sweden and Norway import much, principally from England and Sardinia. Denmark is also a large importer. In Holland and Belgium refined salt is made from British rock salt, which is dissolved in fresh or sea water, and crystal-

lized by artificial heat. All the provinces of Prussia, except Prussia proper, Posen, Brandenburg, and Silesia, produce salt, but the quantity obtained falls far short of the consumption. In 1831 the Prussian mines produced 80,207 tons; in 1843, 91,799; and in 1852, 101,581.—In the Austrian empire Upper Austria, Salzburg, Styria, and the Tyrol on the west, and Croatia and Dalmatia on the south, have almost inexhaustible stores of rock salt and brine springs; while the provinces of Istria and Venice derive much wealth from the lagoons bordering the Adriatic. The salt mines of Wieliczka in Galicia, 10 m. S. E. from Cracow, extend over a space of about 1 mile 7 furlongs in length from N. to S. by 6½ furlongs in breadth, and are about 1,020 ft. in depth. The salt occurs in great lenticular masses, inclined at a high angle. It varies very much in quality; the so called "green salt" contains 5 or 6 per cent. of clay, which destroys its transparency; a variety called *spiza* is crystalline and mixed with sand; while that known as *azybik*, which principally occurs in the lower levels, is in largely crystallized masses, perfectly pure and transparent. The strata in which it occurs are compact tertiary clays, containing fossils; and the principal associated minerals, beside gypsum, are bitumen, anhydrite, the sulphates of baryta and strontia, and sulphur. The mines are entered by 11 shafts, with galleries at 5 different levels, leading to a labyrinth of passages and immense excavations extending to a total length of 270 miles. Some of the chambers formerly excavated were more than 150 ft. high, but those now made are much smaller. One of these is fitted up as a chapel dedicated to St. Anthony, in which the altar, statues, columns, pulpit, &c., are all of salt. In another part is a lake 650 ft. long and 40 ft. deep, formed by the water which trickles through the strata. When any of the imperial family visit the mines, the principal passages and chambers are brilliantly illuminated, and in the great hall of reception festivals have often been held. It is not known when these mines were discovered. They were worked at the commencement of the 12th century, when they belonged to Poland, and in the 14th Casimir the Great established regulations for their working, as they had then become very productive. In 1656 they were ceded to Austria, but recovered by John Sobieski in 1683. In 1772, when the first dismemberment of Poland took place, Austria again obtained them, and, except from 1809 to 1815, has since held them. The kings of Poland drew their chief revenues from these mines, and depended upon them for the dowries of their queens and the endowments of their convents, to which last purpose their revenues were applied as early as the 14th century. At each royal election, the nobles always stipulated that the salt of Wieliczka should be supplied to them at the mere cost of extraction. At present about 1,000 men and 400 horses are employed there. From Galicia a

saliferous region extends on both sides of the Carpathians through Hungary and Transylvania into Wallachia and Moldavia. The richest mines of Hungary are in the county of Mármaros, and the total produce amounts to more than 40,000 tons, which is however quite insufficient for the wants of the country. In Transylvania 75,000 tons are obtained from mines which have been worked since the times of the ancient Romans, and there are also 120 salt springs. Salt is the principal article of export, to the extent of 70,000 tons. Venice in former times owed her prosperity in great part to her salt lagoons and her control of the trade in salt in southern Europe. During the decline of her power her salines remained unproductive, until they were reestablished on a vast scale by Napoleon Bonaparte. They are again largely worked in the artificial enclosures around the city connected with the sea. In 1842 the salt produced in the whole Austrian empire was estimated at 882,000 tons, but it is now probably much more.—In Switzerland the brine springs of Bex have been worked since the middle of the 16th century. They formerly belonged to a family of Augsburg, named Zobel, but are now the property of the government of the canton (Vaud). In 1823, in consequence of the gradual failure of the springs, the mountain was pierced by a gallery, which led into a vein or dike of salt, varying from 2 to 50 feet in thickness. In 1846 it had been penetrated to a distance of 4,000 feet, and to a height of 600 feet. It cuts nearly perpendicularly through a mass of anhydrite (sulphate of lime without water). The salt when mined is thrown into large reservoirs cut in the solid anhydrite in the inferior of the mines, and there dissolved in water, and when sufficiently saturated the brine is conveyed in wooden pipes to the boiling house. The strong brines are at once boiled, and the weaker concentrated by the process of graduation. In 1846 the product of the springs and mines was from 1,000 to 1,500 tons. Springs are found in other parts of Switzerland.—In Italy the lagoons and springs, still highly productive, were worked in ancient times, and contributed not a little to the prosperity of the Roman empire. In the former Sardinian states salt is a strict government monopoly, and their springs and salines furnish one of the chief articles of export, amounting to from 14,000 to 15,000 tons annually.—Spain possesses one of the most remarkable salt mines in Europe, at Cardona in Catalonia. Here is a hill 328 feet high, covering an area of ¾ of a square mile, composed of nearly vertical beds of salt, gypsum, and clay belonging to the cretaceous series, the salt constituting about ¼ of the entire mass. The salt is of 3 varieties, the first and rarest occurring in very largely crystalline masses, semi-transparent and colorless, sometimes yielding on being split perfect cubes of 8 inches on a side; the second pure but fine-grained, translucent, of grayish white, pearl gray, reddish white,

flesh red, and brownish red colors; the third impure, granular, mixed with clay and gypsum. The workings are in the form of long steps of one metre (39 inches) in height and width, cut in the salt, in the open air, by means of blasting and the pick. The salt is simply ground and washed to prepare it for sale. The value of the annual product formerly amounted to \$200,000. Salt springs are found in other parts of Catalonia and along the Pyrénées in beds of the same age, as at Pampe-luna in Navarre. Most of the salt of Spain, however, is obtained from sea water, especially in Valencia and Catalonia. Salt is a strict monopoly in Spain, and can be sold by individuals only for exportation. The foreign sales are chiefly for the United States, the countries on the Baltic, Brazil, and La Plata. The average price for export is  $3\frac{1}{2}$  cts. per bushel. The domestic consumption is very large, particularly for the flocks of merino sheep, 1,000 sheep requiring about 2,500 lbs. annually, and the whole consuming about 15,000,000 lbs. To the fear of discouraging the raising of these is attributed the fact of the price of salt being kept down by the government below the rates in France.—In Portugal salt is manufactured principally from sea water, and the business is largely carried on, sustaining a considerable export and coasting trade. The St. Ubes salt, well known in commerce, and much esteemed for packing provisions, is a product of Portugal. In 1851 the whole amount made in the country was 10,437,456 bushels. The export, and that of the Cape Verd islands also, is principally to Brazil and the United States. The latter in 1857 took 112,068 bushels, worth \$15,442.—In France beds of rock-salt and important springs are found in the upper beds of the trias formation in the eastern departments. The mines in the department of Meurthe, including the celebrated deposits of Vic and Dieuze, are worked over a belt of country 16 m. from E. to W. and 9 m. from N. to S. The shafts have passed through 13 beds of rock salt of an aggregate thickness of 228 feet. Springs abound in the same region, the brine from which is brought to saturation by the addition of rock salt. Dieuze produces about 1,000,000 bushels annually. In other departments along the Vosges and the Jura, and in central France, salt is an important product. Along the Pyrénées rock salt and springs are found in the cretaceous formation. But the greatest portion of the product of France is from the lagoons on the Atlantic and Mediterranean coasts. The operations at Berre near Marseilles are described by Mr. T. S. Hunt in a paper published in the "Geological Survey of Canada" for the years 1853-'56. The waters of the Atlantic contain from 2.5 to 2.7 per cent. of common salt, and those of the Mediterranean about 3 per cent. While the latter therefore afford a stronger brine, the dry and hot summers of the southern shores are also more favorable for the evaporation (which is conducted without arti-

ficial heat) than the cooler and more rainy coasts of Brittany and La Vendée. The Mediterranean waters, moreover, contain about 0.8 per cent. of sulphates and chlorides of calcium, magnesium, and potassium; and from the residue, or mother liquors, after most of the common salt has been separated, it is found that salts of magnesia and potash and sulphate of soda may be obtained of almost equal value with the salt which is the primary object of the manufacture. The salines of Berre, however, where these operations are very successfully conducted upon a grand scale, do not use the strong sea water, but are supplied from a lake which, though connected with the tide, is freshened fully one half by streams from the interior. Other advantages afforded by the situation compensate for this weakness of the brine. The evaporating surfaces employed cover 815 acres, of which  $\frac{1}{10}$  is devoted to the salting tables. The total annual product of salt is about 44,000,000 lbs. At Baynas, as M. Payen states, the same amount is made with strong sea water on 870 acres. The broad receiving basins of these salines must be so situated that they can be flooded at very high tides, and be protected by dikes against their incursions when supplies of salt water are not wanted. A clayey soil is important to prevent infiltration, and give strength to the dikes. The water being let into the great shallow basins, it is allowed to remain till it deposits its sediments and begins to evaporate by the warmth of the sun. It is thence conducted successively through other basins of 10 to 16 inches depth, in which the evaporation goes on, and the lime it contained is deposited as a sulphate. As its bulk decreases smaller shallow basins suffice for holding it after it is separated from the sediments and lime, and in these it is concentrated by continued evaporation to a saturated brine. When this marks 25° Baumé, it is transferred to the salting tables, upon which the crystalline crusts soon collect. Pure salt to the extent of 25 per cent. of the whole product separates between 25° and 26°, and may be kept by itself, the brine in this case being removed to another table. Upon this salt of second quality is deposited to the extent of 60 per cent. of the whole, between 26° and 28.5°; and upon other tables the remainder is collected between the last degree named and 32°. The last product, though somewhat impure and deliquescent from the magnesian salts it contains, is preferred for salting fish on account of its property of attracting moisture. The mother liquors are run off to be treated for the other salts. From the salting tables the crystallized salt is taken and made up into pyramidal heaps, and during the summer season these are left exposed to the weather. The little rain that falls promotes the purification of the salt by removing the more soluble foreign matters. Nothing more is done to prepare the salt for the market. Its average price is one franc for 100 kilogrammes (220 lbs.). Steam or horse power is employed

at these large salines to raise the water from the lower basins into the upper ones; the machines that take up the water are lifting wheels of 8 to 16 feet diameter. In 1852 an official inquiry estimated the production of France as follows: in the E. departments, 60,118,700 kilogrammes; in the S. W., 8,922,100 kil.; in the salines on the English channel, 671,200 kil.; on the Atlantic coast, 224,368,700 kil.; on the Mediterranean, 267,849,700 kil.; total, 561,480,400 kilogrammes, or about 552,400 tons. The salt of the first three divisions was made by artificial heat, of the last two by solar evaporation, and the first two nearly represent the product from mines and springs; the rock salt raised, most of which however is redissolved and crystallized, has been estimated by another authority at 43,000 tons or 43,690,000 kilogrammes.—England, which now produces more salt than any other country, obtains her supply almost exclusively from mines and springs in beds of the same geological age as those of Vic and Dieuze in France, principally in Cheshire and Worcestershire; there are also brine springs in Staffordshire, from which Hull is supplied. Northwich and Winsford in Cheshire, on the river Weaver, furnish  $\frac{2}{3}$  of the whole; and the beds of rock salt are chiefly limited to the region drained by this river. They occur in detached masses of limited area beneath the plains of this district, sometimes spreading out, as at Northwich, to a breadth of  $\frac{2}{3}$  of a mile. The strata penetrated at this locality are gypsiferous clays and marls to the depth of 120 feet, below which are found beds of salt 60 to 90 feet thick, resting on 30 to 40 feet of indurated clays containing seams of rock salt, and below these rock salt about 100 feet thick. The purest salt is in a portion of 4 feet thickness about 10 or 12 feet above the bottom of the upper bed; and in another of 20 feet thickness 60 or 70 feet below the top of the lower bed. Other portions of the beds are earthy. The salt is not stratified, but divided into vertical prisms sometimes 3 feet in diameter. The Cheshire salt is, however, mostly obtained from wells of 200 to 250 feet depth, terminating in the lower bed of rock salt. In these the brine is pumped up and thence conveyed to the evaporating pans, which are 20 feet wide, 30 to 80 feet long, and 16 to 20 inches deep. About 12 cwt. of coal is consumed to every ton of salt. At Northwich a pure kind of rock salt is also mined and dissolved. In 1857, 1,172,437 tons of white salt and 65,773 tons of rock salt were manufactured in Cheshire; 648,516 tons of white salt and 87,119 tons of rock salt were exported. (The discrepancy in the rock salt arises from a difference in the commencement of the year.) The United States are the largest customers, taking 200,625 tons, 78,747 tons of which went to New Orleans. It is known in commerce as Liverpool salt. Calcutta took 78,740 tons. The rock salt is principally sent to Belgium and Holland. Droit-

wich and Stoke in Worcestershire in 1857 made 196,500 tons. In 1852 there were 97 salt works in England, of which 79 were in Cheshire, 1 in Lancashire, 2 in Staffordshire, 13 in Worcestershire, and 2 small establishments in Durham. The springs of Droitwich were worked by the Romans, and in Cheshire "the Wiches" were very productive in the reign of Edward the Confessor, but the bed of rock salt has been known only 200 years. Very heavy excise duties were formerly imposed upon salt, but it is now free. In Scotland, before the abolition of the duty, much salt was made from sea water, but most of the salt works are now abandoned. In Ireland two beds of rock salt, making together a thickness of 120 feet, covered by 680 feet of red marls, were discovered about 1853 at Carrickfergus near Belfast; and in 1857, 27,335 tons of rock salt and white salt were prepared for sale. The total product of the United Kingdom in 1857 was 1,462,045 tons, of which 651,766 tons were exported. The value of the export for 1858 was £287,545, for 1859 £253,922, and for 1860 £358,090.—The total product of the mines and springs of Europe was estimated in 1821 at 1,250,000 to 1,500,000 tons. It is now certainly twice as great as the smaller, and probably as the larger of these estimates; and with the addition of that from sea water and salt lakes, the total product is probably between 4,500,000, and 5,000,000 tons.—In Asia salt is no less abundant than in Europe. In Siberia and Tartary plains are covered with saline incrustations. Extensive mines of rock salt have been worked from ancient times at Nakhshivan in Armenia. This variety abounds in Persia, where are also more than 30 salt lakes without outlets. Lake Ooroomiah, 90 m. long and 30 broad, and situated about 4,100 feet above the sea level, contains brine of extraordinary strength, the percentage of pure salt being 18.116 and other salts 2.434. Its specific gravity is 1.155. In summer, over a breadth of 3 or 4 m. around parts of this lake, the incrustation of salt is sometimes more than a foot thick. Most of the salt used in E. Kooristan is from this lake. In Palestine the waters of the Dead sea contain a still larger proportion of saline matters, though only 8 per cent. of pure salt. (See DEAD SEA.) The natural resources of British India in salt are very great, but rendered comparatively unimportant by the monopoly of the government, and salt is largely imported from England. Still vast beds of rock salt are worked in the Punjab at the foot of the Himalaya, and great quantities are obtained from the incrustations over the plains near the mouth of the Indus, and from various other portions of the Indian peninsula. The salt wells of China are remarkable for their great depth and immense numbers: Mention is made of them in ARRIAN WELLS, vol. ii. p. 172. China and Java also are wholly dependent upon their own resources in this article, admitting no importa-

tions from abroad.—Africa contains extensive tracts of salt lands and beds of rock salt in the desert of Sahara, particularly in the N. and W. portions, as in that part called Tanzezruft, on the route between Tuat and Timbuctoo. The trade in salt with Soodan furnishes a support for many of the inhabitants of the desert. Near Biskra is a mountain of salt in the cretaceous formation; and another is found near the salt lake Zagrez. This lake is in some seasons covered with a glistening white crust of excellent salt, like ice, amounting to even one or two feet in thickness. Other lakes of similar character are met with in this region, and also in Abyssinia. In central Africa, salt obtained from salt lakes is perhaps the most important article of commerce. In portions not provided with it its want is severely felt, and Mungo Park speaks of its being there regarded as the greatest luxury, and pieces of it when obtained by the children are eaten as if it were sugar. He himself experienced great distress for want of it. Salt water lakes are found in S. Africa also, and are known among the colonists as *zout pans*. One of these is covered over the bottom with a layer of very hard rock salt. Around the margin it is quarried with picks; and during the prevalence of the dry S. E. summer winds the surface is covered with a beautiful deposit of pure white salt like flakes of snow.—In the Sandwich islands salt is procured from the salt lakes near Honolulu, and is an article of export. Sea water is evaporated for salt in Hawaii.—In South America, rock salt is found in Brazil, Peru, New Granada, and Venezuela; in the pampas of the south and the elevated plains of Peru, it occurs as an incrustation; in Patagonia and La Plata are productive salt lakes; in New Granada salt is obtained from springs, and in Brazil from lagoons on the coast. The salines or salt lakes of the pampas extend from Port St. Julian in Patagonia, lat. 49° S., to Chaco in the Argentine republic, lat. 25° S. They are from 3 or 4 to about 200 feet lower than the surrounding plains, occur at different elevations above the sea, and are sometimes of very considerable size. They are generally very shallow, and in the wet season the whole or a part of the salt is dissolved, and redeposited during the dry season, when the appearance of the snow-white expanse, crystallized in great cubes, is very striking. About 450 m. S. W. by W. from Buenos Ayres is a very large lake, called Urre Lauquen, about 30 m. long and 15 broad, from which that city drew its supplies of salt before the port was thrown open to foreign trade. Patagonian salt is still a large article of commerce with other parts of South America. It is of the greatest purity, requiring no preparation, and containing only 0.26 per cent. of gypsum and 0.22 of earthy matter, without a trace of iodine salts. It does not answer as well for preserving meat as sea salt, probably from its entire freedom from the deliquescent chloride of magnesium. The beds of various salts in the elevated plains of Tarapaca

in Peru, especially around Iquique, are among the most remarkable in the world. The porphyritic mountains on the coast rise abruptly to a height of between 1,900 and 3,000 feet; between their summits and an inland plain, on which the celebrated deposit of nitrate of soda lies, is a high undulatory district, covered by a crust chiefly composed of common salt, either in white, hard, opaque nodules, or mingled with sand, forming a compact sandstone. This never attains a great thickness, though in the pampa of Tamarugal, in South Peru, Mr. J. H. Blake saw a considerable space covered with round masses of salt, 5 or 6 feet in diameter, piled upon each other. In some places they were of a deep red, but in the vicinity of Pisco they were sufficiently pure for culinary purposes. The inhabitants employed them in building their houses. As rain falls here only at intervals of many years, the deposits are subjected to very little waste. (See ANDES, and NITRATES.) M. d'Orbigny observed analogous saline beds extending from Cobija in Bolivia for 5° northward, at heights varying from 600 to 900 feet. From the presence of recent sea shells on these beds, he concludes that they have been formed by the evaporation of sea water, and Darwin thinks that this is the case also with the Iquique beds, though standing at about 3,000 feet above the sea. Salt is also stated by Darwin to occur in a stratified form in thin layers among sandstones at several points on the shores of Peru, as in the island of San Lorenzo, off Lima, where a series of sandstones and shales of 800 feet in thickness is filled with little seams of it. Considerable quantities of salt are sent from Payta to Chili. New Granada has very rich mines of rock salt, especially in the district of Zipaquira. The mineral extends many miles across a branch of the Cordillera, and the mines near Bogota are stated by Gen. Mosquera to yield nearly \$1,000 per day. Salt springs are also found here. On the N. coast are lagoons of great capacity of production. The salt mines of Araya, in the peninsula N. of Cumana in Venezuela, were discovered by the followers of Columbus in 1499; and as they offered an inexhaustible supply of the finest salt, they continued for years to attract adventurers of all nations. Their products and those of the immense deposits near La Guayra furnish employment for a large number of coasters, as well as some export trade. The island of Margarita has also salt works. The importation of foreign salt into Venezuela is prohibited. The Dutch islands of Curaçoa and Buen Ayre, N. of Venezuela, produce very large quantities by natural evaporation and of the finest quality. In 1847 250,000 barrels were produced, and 108,847 were exported. In 1851, 19,982 barrels were exported to the United States; in 1852, 11,011 barrels; and in 1853, 43,434 barrels; average value, 36 cts. per barrel. British Guiana produces salt from lagoons, and sends some to the United States.—A large number of the West

India islands produce salt, especially the southern Bahamas, Cuba, Porto Rico, St. Martin's, and St. Christopher or St. Kitts. Turk's island, S. E. of the Bahamas, was formerly the main source of sea salt for the United States, and even now most of the salt from any of the West India islands, or from Yucatan and Curaçoa, is called Turk's island salt. Since 1833, however, the manufacture has fallen off here, while it has grown up in the Windward islands and some other British islands. In 1857 the English islands sent 1,033,601 bushels, worth \$153,909, to the United States. In 1853 the Bahamas exported to the amount of \$57,537, equivalent, at 15 cents (the price in 1854), to 383,580 bushels. At St. Kitts, in 1855, salt was worth 20 to 27 cents, with an export duty of 2 cents. Of the Dutch West Indies, beside Curaçoa and Buen Ayre, St. Martin, in the Leeward islands, produces a great deal from lagoons in the southern part, and it is the principal export of Philipsburg, the Dutch capital. In 1857, 174,862 bushels, worth \$31,790, were imported into the United States from the Dutch West Indies. On the N. coast of Cuba are extensive lagoons, from which, in dry years, large quantities are obtained. In Porto Rico are two salines formerly worked by the government, and stated some years ago to yield 160 tons annually. These salt works, as well as the monopoly of the introduction of either Spanish or foreign salt into the island, were sold to private parties in 1851. Cuba and Porto Rico, however, draw most of their supply from Spain, and some from England (1,688 tons in 1857). The duty on foreign salt is \$3.75 on 400 lbs.—In Central America are many salt springs, and on the Pacific coast large quantities are made from sea water. In Mexico the state of Oajaca has salines extending for 30 or 40 leagues along the Pacific, which are very valuable, and supply the whole interior of the state. These formerly belonged to the government, but were sold by Santa Anna to the family of Echeverria for \$300,000. Rock salt may perhaps hereafter be found in Oajaca, as salt springs issue from gypseous strata near San Juan de los Cues. Campeachy produces much salt, which gives rise to an extensive coasting trade from Tampico; and the salt which forms so large an item of the coasting trade of Vera Cruz is probably derived from the same source. In Tamaulipas salt is produced from a chain of lagoons on the coast, divided by the Rio Grande from the celebrated salt lake near Brownsville in Texas. New Leon produces salt, probably from springs. The lake of Tezcuco, near the city of Mexico, is so strongly impregnated as to leave a white deposit on its banks, and supplies a number of salt works. The island of Carmen, in the gulf of California, contains a large salt lake, with a solid crust several feet thick. Large quantities are sent to Mazatlan and San Francisco. In 1857 the price at Mazatlan was \$5 per ton, freight to San Francisco \$10, and export duty 20 per cent.—In British North

America but little salt is made, though in Nova Scotia and New Brunswick salt springs abound. Cape Breton island, Newfoundland, and the Magdalen islands also contain springs. In nearly all these places they are associated with gypsum. In Canada they are few and not strong. Along the N. shore of Lake Ontario are some tolerably copious, but rather weak, brinesprings. In the township of Percy, Northumberland co., much salt was made from several springs during the war of 1812. In the township of Whitby, York co., are several issuing from clay, which become much stronger with additional depth. In the township of Toronto, about Burlington bay and St. Catharine's, are many others, some of which have been worked. On the Bear Lake river, in Hudson's Bay territory, are excellent salt springs, as well as on the Mackenzie river. T. S. Hunt, recommending the establishment of works for the manufacture of salt from sea water in eastern Canada, says that the frosts are severe enough in winter to allow the process by freezing to be employed, and that the strong brines thus prepared could be very rapidly evaporated by the heat of summer, equal to that of the south of France. Canada is at present principally supplied from England and the state of New York, having in 1857 imported 18,819 tons from England, and 509,504 bushels, or about 14,500 tons, from the United States. She is indeed our only customer of importance, the exports of American salt to other countries averaging only 20,000 or 30,000 bushels. The rest of British America in 1857 imported 58,011 tons from England.—The United States is well supplied with salt, 23 of the states and territories having been returned by the different censuses since 1810 as producers, while 7 others possess valuable springs or deposits. Rock salt has been found only in western Virginia. The principal springs are in western New York, near Syracuse, in western Virginia and Pennsylvania, in Michigan, and in the states bordering on the Ohio. Salt lakes occur in California, Utah, New Mexico, Texas, and Minnesota. Salt has been made from sea water in nearly every Atlantic state at some period, but its production has of late years been mostly limited to Florida. In Texas, near the Rio Grande, is a very extensive salt lagoon. The New England states have at different times produced large quantities of sea salt, particularly during the war of 1812 and about 1880, since which time but little has been made. The first attempt appears to have been in 1624 at Cape Ann, but it was not successful. During the revolutionary war much was made by boiling sea water, and after its close an extensive system of salt making by solar evaporation, producing a very pure article, grew up around New Bedford and Cape Cod. Lines of vats more than 1,000 feet in length, with movable roofs, were constructed, and the shores were studded with wind mills by which the water was pumped into the vats. The cheap supplies

of foreign salt finally rendered them unprofitable, though a few vats are still kept in operation at Cape Cod, Nahant, &c. In 1830 about 600,000 bushels were manufactured by solar evaporation in Massachusetts, and a still larger quantity in Maine; and in 1832 the county of Barnstable, Mass., alone had 1,425,000 feet of vats, producing 358,250 bushels, but in 1834 the business was abandoned in consequence of the reduction in duty, &c. In Delaware and New Jersey during the revolutionary war many small works were erected, and frequently destroyed by the British. In 1812 it was made in the flats back of the beaches in Cape May co., N. J., by digging holes in the sand, and allowing the brine to drain in. This was so much concentrated by natural evaporation that a barrel of it evaporated in iron kettles would make a bushel of salt. Virginia had salt works at Cape Charles before 1620, and in 1633 exported salt to Massachusetts. In South Carolina, Nathaniel Johnson undertook the manufacture in 1689, and in 1725 the legislature passed two acts for the encouragement of salt making. In Florida none is reported before 1840, but in 1857 it was estimated that 100,000 bushels were made, mostly at Key West. Texas made about 20,000 bushels in 1857, probably from the salt lagoon before spoken of. Salt is now made in large quantities from sea water near Los Angeles, Cal.—The salt springs of New York, which furnish nearly half the domestic supply, are principally situated in Onondaga co., in the towns of Syracuse, Salina, and Geddes, and issue from rocks of upper silurian age. They were known to the Indians at a very early period, but Father Lalle-mant is believed to have been the first white man who visited them. Le Moynes, a Jesuit, also mentions them in 1653. About 1770 Onondaga salt was in common use among the Delawares, and was brought to Quebec for sale. The first made by the whites was in 1783, near Syracuse, by boiling. The salines belong to the state, which supplies the brine to manufacturers and receives a royalty of 1 cent a bushel. Six cents was formerly charged, and the state thus derived a large revenue; but in 1846 the tax was reduced to its present amount, which suffices to defray the expenses of pumping, superintendence, &c. In 1789-'90, 500 or 600 bushels were made and sold at \$1 a bushel. In 1791 the capacity of the works was 8,000 bushels a year. In 1797, when the first leases of salt lots were made, the product was 25,474 bushels; in 1807, 165,448; in 1817, 448,665; in 1827, 983,410; in 1837, 2,161,287; in 1847, 3,951,351; and in 1858, 7,033,219 bushels. From Jan. 1 to Aug. 3, 1861, the product was 2,403,583 bushels, and the entire product for the year was estimated at 7,000,000 bushels. The productive springs are in great part found in the marshy lands which surround Onondaga lake, a sheet of fresh water 6 miles long and a mile wide. A stratum of marl 3 to 12 feet thick, underlaid by a marly clay, forms an impervious

barrier between the water raised from the wells and that of the lake. Wells are sunk or bored in the low lands around the lake to various depths from 200 to 300 feet, and from these the salt water is forced up by pumps into the reservoirs from which the evaporating works are supplied. The strata passed through near the surface are beds of fine sand, and then clay, sometimes more than 40 feet thick, beneath which is gravel of pebbles and sand containing salt water. The brine is of variable strength in the different wells, as indicated by its specific gravity, which is from 1.045 to 1.147, and from 30 to 45 gallons are required for a bushel of dry salt weighing 56 lbs. The chief impurity is sulphate of lime, which was found by Dr. Lewis C. Beck to amount to 4.04 to 5.69 per cent. Excepting the chloride of magnesium, the impurities found in these brines are also common to rock salt. From the deepest wells at Syracuse Dr. Beck obtained brines which afforded 173.50 parts of salt in 1,000 parts, and of which 83½ gallons were required to the bushel of ordinarily dry salt. The deepest wells now afford brines containing 17 to 20 per cent. of salt. The brine from the wells, being received in large reservoirs, is allowed to remain until some of its impurities, the oxide of iron particularly, are deposited. This operation is hastened by the addition of about 2 lbs. of alum to 5,000 gallons of brine. Stirring in clay has a similar effect, and also heating the brine. Lime was formerly used for the same purpose; but this is now given up. About ¼ of the whole salt product is separated by solar evaporation and ¾ by boiling. The great reservoirs for the former process, or solar salt grounds, cover about 700 acres of land. They are divided into tanks of about 16 by 18 feet each, and 6 inches depth, which are provided with movable covers, and the annual product of each one of these is about 50 bushels of coarse salt such as is used for packing and curing provisions. The weight of a measured bushel of this salt is about 70 lbs. The boiled salt is rated at 56 lbs. to the bushel, and 5 of these bushels make a barrel; but the actual weight is found to vary considerably above and below 56 lbs. according to the position of the kettles in regard to the fire. The duty paid to the state for solar and boiled salt is calculated on 56 lbs. to the bushel. The boiling is conducted in large iron kettles holding about 100 gallons each, and set in "blocks" of brick work close together, and in a single line, or in two parallel rows, the whole length of the block. A double block may contain 80 kettles, and may make in a year from 20,000 to 25,000 bushels of salt, with a consumption of a cord of hard wood or a ton of coal for every 45 bushels. There are in all 312 blocks, containing 16,484 kettles, and capable of making 12,480,000 bushels of salt a year. The sulphate of lime separates just before the salt begins to crystallize, and is caught in a pan placed for the purpose in the bottom of each kettle. The appearance of the salt is thus much improved, as it is also



by precipitating and removing the small quantity of oxide of iron in the brine. Methods have recently been introduced also of separating the chlorides of calcium and magnesium, and thus preventing the salt from attracting moisture. Thus purified the salt is perfectly white and as dry as dust in the dampest weather, and wherever known is preferred to any other. When the contents are reduced to  $\frac{1}{2}$  or  $\frac{1}{3}$  the salt is scooped out into a basket, drained back into the kettle, and then put into bins, where it is allowed to drain for two weeks. It is then barrelled for sale. The cost of manufacture is about \$1 a barrel, whether by solar evaporation or by boiling. Salt springs are found in other parts of western New York, especially over the area extending E. and W. 170 m. from Otsego co. to Orleans and Genesee, and N. and S. about 80 m. from Broome co. nearly to Lake Ontario.—In W. Pennsylvania is an important salt region along the Alleghany, Kiskiminetas, and Beaver rivers, in the carboniferous series. In 1812 the first wells were bored 200 feet deep on the Kiskiminetas river, and in 1829 there were extensive works there, using coal, and thus enabled to produce salt at 20 to 25 cents per bushel, while in Kentucky, Ohio, and Illinois it was selling at 50 cents. The production of Pennsylvania in 1857 was estimated at 900,000 bushels.—Virginia has two distinct salt regions, one near the W. boundary line on the banks of the Great Kanawha river, and a second in Washington and Smyth cos. in the S. W., along the banks of the N. fork of the Holston river. The first is in the lower coal measures, and extends 10 or 12 m. along the river. It was first noticed by Indians and settlers as forming deer licks, from which they made a little salt. The first wells bored were only 80 feet deep, but some have since been bored 1,500 feet; 700 or 800 feet is however as great a depth as is generally profitable, as below this the water does not increase, while the discharge of carburetted hydrogen gas becomes much more copious. This gas was formerly employed for heating the kettles, but its use is now almost discontinued. The brine is concentrated by boiling in long pans with sectional cast iron bottoms and wooden sides, and when nearly saturated is conducted into a series of settling and crystallizing reservoirs, heated by steam pipes. The bitter or residual liquor contains a good deal of bromine. In 1829 these works produced 1,000,000 bushels, worth 20 to 25 cts.; they now make 2,500,000 to 3,000,000 bushels, worth 16 to 18 cts. The Holston springs and rock salt are situated on the line of an extensive dislocation of the strata, bringing the lower silurian magnesian limestones into immediate contact with the lower carboniferous strata, the vertical displacement being calculated by Prof. Rogers at not less than 8,000 feet. The dislocation is at least 100 miles long, but no rock salt or workable brine is found except in the Preston valley, on the line of Smyth and Washington counties. Five pro-

ductive wells are now in use, bored to the depth of 200 to 300 feet, and 4 inches diameter. In one well, over 300 feet of rock salt divided by a little clay was passed through without tapping any brine. There appears to be no solid rock, but a deposit of clay and earth, imbedding in places large bodies of rock salt and gypsum, and saturated in its lower portions with highly concentrated brine. The product is now more than 300,000 bushels of 50 lbs. to the bushel, and worth about 50 cents. The brine contains about 23 per cent. of salt, is entirely free from chlorides of calcium and magnesium or oxide of iron, making a very dry and colorless salt, and is in such abundance that only 2 out of the 5 wells are generally in use. The following is the transportation of salt from this district over the Virginia and Tennessee railroad for the years named:

Years.	Sent east, lbs.	Sent west, lbs.	Total, lbs.
1855.....	.....	2,158,212	2,158,212
1856.....	127,400	2,575,004	2,702,404
1857.....	990,992	2,516,135	3,507,127
1858.....	2,127,873	4,591,442	6,729,315
1859.....	2,198,694	7,406,357	9,605,051

A branch railroad  $9\frac{1}{2}$  m. long was completed in Sept. 1856, at a cost of \$212,790, connecting the salt mines with the Virginia and Tennessee railroad. It is dependent wholly on the business connected with these and the plaster banks. In eastern Tennessee are some salt springs, but not very strong. At Estabrook, Anderson co., a well was sunk 900 feet in a dislocation of the strata, perhaps corresponding in age with that of the Holston.—Ohio comes next to New York and Virginia in the extent of production. The springs are situated in the S. E. and S. parts of the state, on the Muskingum, Hocking, and Scioto rivers, and at Pomeroy on the Ohio, nearly opposite the mouth of the Kanawha. Those on the Muskingum and Hocking, and near Pomeroy, are in the same formation as the Kiskiminetas and Kanawha brines. The first attempts in Ohio were made in 1798 at the "old Scioto salt works" in Jackson co. The wells were only 80 feet deep, and 600 to 800 gallons were required to make a bushel of dark and inferior salt, which however sold for \$3 or \$4, being carried, even as late as 1808, on pack horses to considerable distances. Till within 8 or 10 years, the wells were sunk only 400 or 500 feet in depth, but at Pomeroy they are 1,200 feet deep, yielding a copious supply of strong brine, and two thirds of the salt of Ohio is now manufactured in that vicinity. From some of the springs issue large quantities of carburetted hydrogen gas, which is used as fuel in evaporating. Rock oil is also a product of them. (See PETROLEUM.) In 1850 Ohio produced 550,350 bushels, and in 1857 the estimate was 1,500,000 bushels, or nearly three times as much. Indiana has numerous salt springs, especially along the Wabash river in the coal measures. In Fountain co. a well 700 feet deep gave a brine

yielding a pound to a gallon. The salt works of southern Illinois, also in the coal measures, were formerly of great importance, and might still furnish almost unlimited quantities. The springs near Equality, Gallatin co., were worked by the Indians and French of Vincennes in 1720. The most important were the United States and Wabash salines in Gallatin co. Others were situated in Jackson co., on the Big Muddy river, in Madison and Vermilion cos. The Wabash saline in 1809 made 130,000 bushels, and the United States saline, about 1820, at least 150,000 bushels; but in 1860 the whole product of Illinois was only estimated at 60,000 bushels. The numerous salines in this state and the others on the Ohio rendered salt so abundant, that during the war of 1812 it cost only about 87½ cents a bushel in the West, while on the seaboard it was selling at \$5 or \$6. In Kentucky salt springs or licks are very numerous, and even previous to 1795 much salt was made there. The principal licks are: one on Salt Lick creek, near the Ohio; the upper and lower Blue springs on Licking river; Drennon's lick, on the Kentucky river; Big Bone, Long, Bullett's, and Mann's licks. The principal works now in operation are on Goose creek; they made in 1860 about 290,000 bushels. Missouri has many salt springs, mainly situated in Cooper and Saline cos., on the Missouri, and in St. Genevieve and Jefferson cos., on the Mississippi, but the brine is generally weak. In Marion co. is a spring said to yield a much stronger brine. In Michigan is a valuable salt region in Saginaw co. Many licks and springs have long been known, and in 1838 unsuccessful attempts were made by the state authorities to work some of them. In 1859 the legislature offered a bounty of 10 cents a bushel for salt made in the state, and a company in E. Saginaw bored a well, and obtained at 669 feet nearly saturated brine, and made from June, 1860, to Jan. 1861, 23,000 bushels of excellent salt. Their success has led to the formation of 7 other companies, whose wells are in various states of forwardness. This well passes through the coal measures. Another was bored near it, to the depth of 806 feet, by the same company, in Dec. 1860. A weak brine comes within 15 feet of the surface, but tubes are carried down 150 feet, and a constant supply of strong brine is obtained. At Portsmouth and Bay City are two wells, 664 and 505 feet deep, which are almost equally strong. Near Grand Rapids in Kent co. are several wells, commencing in the carboniferous limestone, the deepest of which penetrates 351 feet into the devonian rocks. These afford only weak brines. In the N. W. part of Minnesota there is said to be a lake of concentrated brine, fringed with a thick incrustation of pure salt. In Lancaster co., Nebraska, springs giving 43 to 50 lbs. to 50 gallons are found, and a considerable quantity of excellent salt is said to be made. In Kansas, the Indian territory, and western Arkansas, along the Arkansas and Washita rivers, in N.

W. Texas, New Mexico, and Utah, is a vast expanse of sterile plains, principally occupied by cretaceous rocks, in nearly every part of which salt lakes and incrustations and vast masses of gypsum occur. Near the head waters of the Brazos in Texas is a large lake. Near Manzano in New Mexico is a large one, which supplies all the upper part of the territory with salt. But the most famous of these lakes is the Great Salt lake of Utah, which is about 50 m. long and 20 m. wide, and whose waters are nearly saturated, containing 20.2 per cent. of common salt, and 2 per cent. of other salts. (See GREAT SALT LAKE.) In California are also numerous salt lakes, particularly in Tulare co., at the Cañada de las Uvas; in the Taheechaypah pass of the Sierra Nevada, near which is a dry lake from which a considerable quantity, fit for table use, has been taken; at the termination of the Mohave river, in the Great Basin, &c.—The relative strength of the various brines employed in the United States for the manufacture of salt is thus given by Dr. Beck, the figures representing the number of gallons required to the bushel of ordinary dryness:

Sea water from . . .	800 to 350	Illinois river, Ark. . . . .	80
Boon's Lick, Mo. . . . .	450	Kanawha, Va. . . . .	75
Conemaugh, Penn. . . . .	800	Montezuma, N. Y. (old wells) . . . . .	70
Shawneetown, Ill. . . . .	250	Grand Rapids, Mich. 50 to	60
Jackson, O. . . . .	218	Muskingum, O. . . . .	50
Lockhart's, Missa. . . . .	180	Montezuma, N. Y. (new well) . . . . .	50
Shawneetown, second saline . . . . .	128	Onondaga, N. Y. (old wells) . . . . .	40 to 45
St. Catharine's, Canada West . . . . .	120	Onondaga, N. Y. (new wells at Syracuse) 30 to	35
Zanesville, O. . . . .	95		
Grand river, Ark. . . . .	80		

The Holston brine of Virginia is stronger than the last of these. The comparative value of the different brines is dependent in great part on the abundance of cheap fuel for evaporating them, and to some extent on the nature as well as quantity of their impurities; and again on their position as respects large markets. The English salines have the advantages of great strength, purity, abundance of the cheapest fuel near at hand, and close proximity to important seaports, and are thus able to supply this valuable product upon our coasts cheaper than we can obtain it from our own resources. In 1790 we imported 2,337,920 bushels; in 1825, 4,574,202 bushels; and in 1860, 14,094,227 bushels, of which 10,335,256 were from England, 473,518 from Spain, 444,085 from the Two Sicilies, 58,473 from France, 1,705,510 from the British and 522,263 from the Dutch West Indies, and 228,287 from Mexico, while the rest came from 17 other countries. In the same year the domestic product was estimated at 13,388,447 bushels, of which 475,445 bushels were exported, nearly all to Canada. In the following table the values and amounts of salt produced in the United States are taken from the census returns, except the estimates for 1857 and 1860, which are from reports by Mr. Samuel Hotaling of New York. In the census of 1840, the value is taken as 20 cents per bushel, giving the product for that year as 6,179,175 bushels.

VALUE AND AMOUNT OF SALT MANUFACTURED IN THE UNITED STATES.

States.	1810.	1820.	1830.	1840.	1850.		1857.	1860.
	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.	Bushels.	Bushels.	Bushels.
Arkansas.....	.....	.....	.....	1,740	.....	.....	.....	.....
California.....	.....	.....	.....	800	5,600	40,000	.....	250,000
Connecticut.....	.....	.....	.....	282	.....	.....	.....	.....
Delaware.....	2,050	1,425	5,000	2,400	6,000	.....	100,000	70,000
Florida.....	.....	.....	.....	4,000	6,000	20,000	50,000	60,000
Illinois.....	.....	1,573	.....	1,250	.....	.....	.....	.....
Indiana.....	.....	.....	.....	43,939	57,525	246,500	250,000	290,000
Kentucky.....	824,870	188,840	.....	.....	.....	.....	.....	.....
Louisiana.....	6,110	.....	.....	10,000	9,700	.....	.....	.....
Maine.....	.....	.....	240,025	240	.....	.....	.....	.....
Maryland.....	8,769	.....	.....	75,319	93,550	.....	46,000	825,000
Massachusetts.....	92,595	95,436	205,776	2,680	.....	.....	10,000	60,000
Michigan.....	.....	58,000	.....	240	.....	.....	.....	.....
Missouri.....	.....	.....	750	100	.....	.....	.....	.....
New Hampshire.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey.....	.....	.....	.....	.....	.....	.....	.....	.....
New York.....	.....	669,041	802,507	573,577	998,315	4,500,000	6,000,000	5,598,447
North Carolina.....	8,800	13,350	.....	899	.....	.....	.....	.....
Ohio.....	24,000	129,126	.....	59,470	132,239	550,350	1,500,000	2,050,000
Pennsylvania.....	1,000	100,000	180,215	169,595	206,796	919,100	900,000	450,000
Rhode Island.....	600	750	.....	.....	.....	.....	.....	.....
South Carolina.....	.....	.....	.....	450	.....	.....	.....	.....
Tennessee.....	.....	15,912	.....	.....	.....	.....	.....	.....
Texas.....	.....	.....	.....	.....	5,900	8,000	20,000	50,000
Utah.....	.....	.....	.....	.....	.....	.....	.....	60,000
Virginia.....	704,000	575,500	.....	849,124	700,466	3,479,590	3,500,000	3,650,000
Total.....	1,163,094	1,852,253	985,173	1,285,585	2,222,691	9,768,840	12,876,000	12,593,447

SALT LAKE. See GREAT SALT LAKE.

SALT LAKE, a N. E. co. of Utah territory, lying principally between Great Salt lake and the Rocky mountains, and drained by Green and Bear rivers and other smaller streams; pop. in 1860, 11,296. The surface is generally mountainous. In the vicinity of the lake the soil is very fertile. The productions in 1850 were 58,492 bushels of wheat, 25,859 of potatoes, 5,220 of Indian corn, 4,906 of oats, 37,502 lbs. of butter, and 2,205 tons of hay. The mountain streams and lake abound in excellent fish.—SALT LAKE CITY, the capital, is situated on the E. bank of the Jordan river, the stream which connects Great Salt lake and Lake Utah, 20 m. S. of the former, 4,350 feet above the sea; pop. in 1860, 8,218. It was settled by the Mormons in 1847. The city contains 260 blocks of 10 acres each, divided into 8 lots, and 4 public squares; its streets are 128 feet wide, and a stream of water flows through each, from which the gardens are irrigated. The houses are built of adobe, and are generally small and of one story, with separate entrances where the proprietor has a plurality of wives. The great Mormon temple, commenced in 1853, is in the Gothic style, 150 feet long and 60 feet wide. One of the largest buildings is the titheing house, where is deposited one tenth of all the products of the territory for the use of the church. Another large building called social hall serves both for a theatre and for the accommodation of social and dancing parties, which are of frequent occurrence. The Wahsatch mountains, 10,000 feet high, and covered with perpetual snow, enclose the valley in which the city stands on the E. side.

SALTA, a N. state of the Argentine Confederation, bounded N. by the republic of Bolivia, E. by the state of Gran Chaco, S. by Tucuman and Catamarca, and W. by Catamarca and Bolivia; area, 100,000 sq. m.; pop. in 1855, 55,000.

The chief towns are Salta, the capital, Jujuy, and Oran. The principal rivers are the Vermejo, on the E. boundary, the Lavayan, and the Salado. The surface is very much diversified, being traversed by several ramifications of the Andes, between which lie fertile valleys. Considerable gold is procured by washing the sands of the rivers. Wheat, maize, the vine, sugar cane, tobacco, cacao, cotton, and indigo are grown; and the cochineal insect is extensively reared. The alpaca is indigenous. The executive power of Salta is vested in a governor, elected by the legislative assembly; and although it forms one of the 13 states of the Argentine Confederation, its dependence upon the central government is nominal.

SALTILLO, a city of Mexico, capital of the state of Coahuila, on the river Tigre, about 60 m. S. W. from Monterey, and 550 N. by W. from Mexico; pop. 8,105. It has several manufactories of woollen blankets and ponchos. The town is laid out regularly, and has a public square and fountain. Seven miles S. is Buena Vista, famous for the battle of Feb. 22 and 23, 1847. (See BUENA VISTA.)

SALTPETRE. See POTASH.

SALTS. Before the time of Lavoisier, the name of salt was applied by chemists to almost any solid, crystallizable, transparent, and soluble body; but he first restricted its meaning by defining a salt as "a body formed by the combination of an acid with a base, in which the properties of both are more or less neutralized." This was a great advance, but when the acids containing hydrogen were afterward discovered, it was perceived that this definition excluded their salts, which consisted only of a metallic element, combined with chlorine, bromine, iodine, sulphur, &c., and to which common salt, the very type of the class, belonged. To these compounds Berzelius proposed to give the title of haloid salts. A further extension of

meaning has since been given, by applying it to all combinations of two binary compounds having a common element. Thus the combination of chloride of gold with another chloride is called a chlorosalt, and a combination of two sulphurets a sulphosalt. The salts of the oxygenated bases may unite to form double salts, of which alum (double sulphate of alumina and potash) is an example. Combinations of oxygen salts with oxides or haloid salts also occur, as well as of oxides with haloid salts, producing oxychlorides, &c. Salts may be neutral, acid, or alkaline, according to the proportion between the acid and the base. The salts formed by any given acid with the protoxides, sesquioxides, &c., of the metals, generally crystallize in the same or closely allied forms, or sometimes an acid may have two or more forms in which its salts occur. As an acid often forms more than one combination with a base, in that case of course different forms are produced. This property, known as isomorphism, extends to the haloid and other salts. The list of salts has of late years been multiplied manifold by the discovery of immense numbers of organic salts, in which either the base or the acid, and frequently both, are replaced by compounds, often very complicated, of carbon, hydrogen, nitrogen, &c. Haloid organic salts also exist, chlorine, bromine, &c., being replaced by such compounds as cyanogen, and the analogy to inorganic salts is in every respect perfect.

**SALTZBURG** (Ger. *Salzburg*), a duchy of Austria, surrounded by Austria proper, Styria, Carinthia, Tyrol, and Bavaria; area, 2,764 sq. m.; pop. in 1857, 146,769. The surface consists partly of a great valley through which the river Salza or Salzach flows, and partly of a rugged and mountainous tract. Salt, iron, lead, copper, and arsenic are abundant.—**SALTZBURG**, the capital (anc. *Juravia*), is situated on the Salza, 156 m. W. S. W. from Vienna; pop. in 1857, 17,253. It stands at the entrance of a long defile that traverses the Rhetian Alps, and is divided into two parts by the river, which is crossed by a wooden bridge 370 feet long. The church of St. Peter contains a monument to Haydn, and has a cemetery with curious ancient tombs. A height on the left bank of the river is crowned by a well preserved old castle. Leather, hardware, and cotton goods are manufactured. Salzburg was a place of importance under the Romans. It was destroyed by Attila in 448, and rebuilt by the dukes of Bavaria, but destroyed by fire in 1195. It again rose to importance under a succession of archbishops, who ruled it till 1802, when it was annexed to Tuscany, and afterward to Bavaria, from which it was transferred to Austria in 1814.

**SALUTATION**, words or signs of greeting by which respect, love, or submission is implied. Usually it includes a contact of some parts of the person, and in this particular there is a vast difference of form prevailing in different countries. The words of common saluta-

tions may be regarded as to a slight extent an index of national character or the circumstances of national life. Among the ancient Greeks, the form was *Xaïpe* ("Rejoice"); among the ancient Romans, *Salve, vale* ("Be healthy, be strong"), and *Quid agis?* ("What doest thou?"). The French say: *Comment vous portez vous?* ("How do you carry yourself?"); the Germans: *Wie befinden Sie sich?* ("How do they find themselves?"); the Italians: *Come sta ella?* ("How does she stand?"); the modern Greeks: *Ti xaveis* ("What doest thou?"); the Dutch: *Hoe vaart gij?* ("How do you fare?"); the Swedes: *Huru mår Ni?* ("How can you?") The fevered country of Egypt is strikingly portrayed in one form of salutation used there: "How goes the perspiration? do you sweat copiously?" In China one form of salutation is: "Have you eaten your rice? is your stomach in good order?" and a similar one also prevails in Holland in the *Smakelijk eten?* ("Have you had a good dinner?"). One Polish form is: *Czyś wesół?* ("Art thou gay?"); and another: *Jak się masz?* ("How hast thou thyself?"). Two common salutations in Russia are: *Zdrastui* ("Be well"), and the peculiar *Kak pozhitayete?* ("How do you live on?"). A common exclamation in Russia, *Bols toboi*, which means literally "God with thee," has now approached rather to the signification of "Devil take you." The salutations of the Arabs and Turks are marked by a strong religious character. Among those of the former people are: "May your morning be good;" "God grant thee his favors;" "If God will, thou art well;" "If God will, all the members of thy family enjoy good health." Among the latter are: "Be under the care of God;" "My prayers are for thee;" "Forget me not in thy prayers;" and "Thy visits are as rare as fine days," an expression evidently of very ancient origin, as it is in no way applicable to their present country. The Persian salutations are marked by a strain of extravagant compliment, such as: "Is thy exalted high condition good?" "Peace be upon thee;" "I make prayers for thy greatness;" "May thy shadow not be removed from our head;" and "May thy shadow never be less." An old English salutation in polite society was: "Save you, sir," evidently an abbreviation of "God save you, sir," just as "Good bye" is a contraction of "God be with you."—The different manners of salutations are far more remarkable than the words. The custom of shaking hands is the one most common among civilized nations. On the European continent it is usual for men who are intimate friends to kiss one another; but this custom prevails in England and America only among women. In the greatest portion of Germany it is an act of politeness to kiss the hand of a lady; but this privilege is allowed in Italy only to near relatives, while in Russia it is extended to kissing the forehead. In the East and among the Slavic nations the salutations partake throughout of the character of self-abasement. The

custom of throwing one's self upon the ground and kissing the feet of the monarch prevailed among the Persians. The Russian also becomes prostrate before his master, clasps his knees and kisses them. In China, an inferior meeting a superior upon horseback dismounts and waits till the latter has passed by. In Japan the inferior removes his sandals when meeting his superior, crosses his hands by placing the right hand in the left sleeve, and then suffering both to fall slowly on his knee, passes the other with a slow and rocking motion of the body, and crying out: *Augh! augh!* ("Do not hurt me!"). In Siam, when the inferior throws himself upon the ground before his superior, the latter sends one of his dependents to examine whether the former has been eating any thing or carries with him any smell at all offensive. If such be the case, he is immediately kicked out without ceremony; but if not, the attendant raises him up. In Ceylon the inferior on meeting a superior throws himself on the ground, repeating the name and dignity of the latter, who appears to take scarcely any notice of the prostrate form which he passes. In other countries the salutations are often made by the contact of other parts of the body beside the hands and the lips. In the Society and Friendly islands, two persons on meeting salute by rubbing the ends of their noses together, and the salutation is returned by each taking the hand of the other and rubbing it upon his own nose and mouth. The Moors of Morocco ride at full speed toward a stranger as if they intended to run him down, and as soon as they have approached near they stop suddenly and fire a pistol over his head. In one of the Pelew islands the inhabitants grasp either the hand or the foot of the one they wish to salute, and rub their faces against it. In Burmah, in order to kiss, they apply the mouth and nose closely to the person's cheek and draw in the breath strongly as if smelling a delightful perfume; hence, instead of saying: "Give me a kiss," they say: "Give me a smell." The Arab salutations are very ceremonious. If persons of distinction meet, they embrace several times, kiss each other's cheek, inquire several times about the health of each other, and also kiss their own hands. The Arabian dwellers in the desert shake hands 6 or 8 times, and in Yemen persons of rank permit their fingers to be kissed after a long refusal. In Turkey it is the custom to cross the hands upon the breast and bow to the person saluted. Military salutations consist in the touching of the hat or cap, the lowering of swords or of colors, the presenting of arms, or the firing of cannon. Naval salutes are also made by the discharge of cannon, by the lowering or raising of the flag, and by the cheering of the sailors.

SALUZZO, formerly a province, but now an arrondissement of the province of Coni, Piedmont, bounded N. by Turin and Pinerolo, E. by Mondovì and Alba, S. by Coni, and W. by

France; area, 603 sq. m.; pop. in 1858, 158,097. The Po rises within the arrondissement and flows across it in an E. direction. Copper, iron, and marble are found; and linen, silk, and iron are manufactured. Capital, Saluzzo, 30 m. S. W. from Turin; pop. in 1860, 15,814.

SALVAGE, in admiralty, and generally in the law merchant, the compensation earned by persons who voluntarily assist in saving a ship or her cargo from a maritime peril. This compensation is not a mere payment on the principle of a *quantum meruit*, or a remuneration *pro opere et labore*, but a reward for bravely encountering the perils of the seas, given in order that the general interests of navigation and the commerce of the country may be advanced. As to the amount of salvage which shall be decreed, or the proportion in which it shall be given to salvors, there is no fixed rule or practice in admiralty. In some English cases there has been a disposition to discriminate between articles easily saved, as gold and silver coins or bullion, and more bulky and less movable articles, giving a less proportion of the former than of the latter. But there is nothing like this in the American decisions. In respect to derelict or abandoned property, the ancient rule gave one half to the salvor; but now the position seems to be well established that the reward in derelict cases should be governed by the same principles as in other salvage cases, namely, that it shall depend upon the danger to property, value, risk of life, skill, labor, and the duration of the service. The court has no power to decree salvage for saving life merely; but if the saving of life can be connected with the saving of property, then the court will take notice of it. Nevertheless, efforts to save life do not command a compensation so much higher than is given for the saving of property as might perhaps be expected. The reason is, that it is not a deviation when the vessel goes out of her way to save life, and therefore the insurance is not forfeited; whereas it is a deviation to vary from the course for the purpose of saving property, and compensation must be made for forfeiture of the insurance.—It is a cardinal rule that salvage services can be performed only by persons not bound by their legal duty to render them. A crew cannot claim as salvors of their own ship or cargo, not only because it is their duty to save her if possible, but because it would be most unwise to tempt them to let the ship and cargo get into a position of extreme danger, that then, by extreme exertions, they might claim salvage. But to this general rule there is the exception that, where the contract of the seamen is at an end, or the service rendered is so entirely out of the line of their ordinary duty that it may be considered as not done under their contract, there may be a valid claim for compensation. A crew are bound to suppress a mutiny on board their own ship at all events and at every hazard, and cannot claim salvage therefor. If the crew of one ship suppress mutiny or revolt in another,

or retake a captured ship from mutineers or revolvers, this may well found a claim for salvage. If part of the crew leave their ship and go to save another, and thereby acquire a claim for salvage, the rest who remain share in the claim, yet not equally, for their right rests mainly on the increased labor, exposure, or peril which falls on them. For ordinary services rendered to the ship in time of distress, no salvage is due to a passenger; but in his case, as in that of a seaman, extraordinary services may give a salvage claim. A pilot, like a passenger, may become a salvor when his peculiar relation to the ship is dissolved; but most of our state pilotage laws make it part of the duty of a pilot to assist vessels in distress, and either give the rate of extra compensation to be awarded, or point out the tribunal which shall determine the amount due. Extra services are, therefore, generally considered in this country as such, and not as salvage services. The officers and crews of our national vessels are so far bound to rescue a vessel from mutineers that they are not entitled to claim any compensation in such a case, unless perhaps when they incur great personal danger, and use great exertions in the performance of the service. For an ordinary salvage service they are entitled to compensation. A steam vessel may claim salvage, no less than a sailing vessel, though she can often render service with less peril to herself than the latter. As a general rule, none can claim salvage who do not directly participate and aid in the salvage services, or at least promote those services by doing the work of those who render them. But an exception, and a liberal one, is usually made in favor of the owners of the saving vessel, who are not only entitled to claim compensation for stores and other supplies and outlays, but salvage compensation in addition.—A salvage service is possible when the peril encountered is something distinctly beyond ordinary danger, something which exposes the property to destruction unless extraordinary assistance be rendered. But if the master can, by proper use of the means in his possession, save the property, the law presumes that he will, and that the salvor's interference was unnecessary; yet even if the master could save the ship, the salvors may show that he would not have done so. It is not necessary that the distress should be actual or immediate, or that the danger should be imminent and absolute; it will be sufficient if, at the time the assistance is rendered, the ship has encountered any damage or misfortune which might possibly expose her to destruction if the services were not rendered. That the property must be actually saved, and saved by those claiming to be salvors, in order to lay the foundation for salvage claims in admiralty, is quite certain; but if the party encounters the danger, and does all he can to save the vessel, and his services tend in some degree to preserve the vessel, compensation will be awarded to him, although the ves-

sel is mainly preserved by other means. It is equally a salvage service, whether the service be rendered at sea or where the vessel is wrecked on the coast, and whether it be performed by seamen or landsmen. If a vessel at sea is short-handed by reason of sickness, and is navigated into port by part of the crew of another vessel, that is to be treated as a salvage service. So compensation has been granted for keeping near a vessel in distress at the earnest request of her master and crew, although but little aid was rendered.—Salvage is generally decreed on all the property saved, whether ship, cargo, or freight. It is allowed on public property, and all goods of the government pay the same rate as if they were owned by individuals. The general rule is that our courts have jurisdiction over all property, to whomsoever it belongs, which comes within their territorial jurisdiction; but vessels of war, belonging to a foreign neutral power, cannot be arrested in our ports into which they have lawfully come, and the same is true of a private armed vessel sailing under a commission from a foreign government. The private property of a foreign sovereign, or the prize property which a vessel of war brings into our ports, comes within the general rule, and not within the exception.—If assistance is rendered to a vessel under circumstances which would generally constitute it a salvage service, it may yet not be such; as where the service is rendered under a custom to give assistance gratuitously in similar instances, or where the aid is given under a special contract. If two vessels sail as consorts and under an agreement to assist each other, neither can claim salvage for assistance rendered to the other. Even when vessels sailing together are not consorts, nor owned by the same party, it is possible that there may be a usage of mutual help which would defeat a claim of salvage. Thus it is said that if a steamer be stranded on a sand bank in the Mississippi, and another steamer draws her off, usage prohibits any salvage compensation. But a custom of one port that vessels shall assist each other gratuitously is not binding on vessels of other ports rendering assistance to vessels of the port where the custom exists. If, at the time of the service, the salvors make a bargain with the owners of the property in peril, or their servants, as to the amount of salvage, this is enforced by the court against the owners only so far as it seems equitable and conformable to the merits of the case.—Any gross misconduct on the part of the salvors, and especially any embezzlement of the property saved, forfeits their whole claim. The responsibility of the salvors, respecting the preservation and protection of the property, continues as long as the property is subject to the decree of the court. Salvors in possession have a qualified property in the thing saved, whether ship or cargo, or both, and they cannot be divested of this interest until it is taken from them by adjudication. Yet it is not ne-

cessary that they should remain in actual possession, in order to maintain their rights or preserve their qualified property; nor should they do so, to the detriment of the property or the inconvenience of the master and crew.—Military salvage is that which is earned by rescuing vessels or cargoes from pirates or the public enemy. In cases of recapture, it follows as an incident of prize, and is awarded of course by the court of restitution. The amount of salvage is fixed by statute for most of these cases, and when not so determined must be governed by the general principles of law.

**SALVANDY**, **NARCISSE ACHILLE DE**, a French author and statesman, born at Condom, Gers, June 11, 1795, died Dec. 15, 1856. In 1813 he left college to enlist in the imperial guard, was wounded at the battle of Brienne, rose to the rank of adjutant-major, and received the cross of the legion of honor from the hand of Napoleon himself at Fontainebleau. He afterward espoused the cause of the Bourbons, and in 1816 published *La coalition et la France*, which was so objectionable to the commanders of the allied armies that it was seized, and he owed safety to the king's protection. When the foreign armies left France, he was appointed master of requests in the council of state, but in 1821 issued a pamphlet, *Des dangers de la situation présente*, which caused his dismissal from the council. In 1823 appeared his *Alonzo, ou l'Espagne, histoire contemporaine* (4 vols. 8vo.), an eloquently written novel. In 1824 he produced *Islaor, ou le barde Chrétien*, became connected with the *Journal des débats*, and assisted Châteaubriand in the war he was waging against the ultra royalists. Under Martignac he was recalled to the council of state; but on the accession of Polignac in 1829 he resigned and returned to the *Journal des débats*. He published in 1829 his *Histoire de Pologne avant et sous le roi Jean Sobieski* (3 vols. 8vo.). After July, 1830, he kept aloof from the new government. From 1833 to 1848 he was a member of the chamber of deputies, and in 1850 he was admitted to the French academy. From 1837 to 1840 he was minister of public instruction under Count Molé. In 1841 he was appointed ambassador to Spain, but never assumed the office. In 1843 he was sent to Turin in the same capacity and created a count, but in 1844 resigned. In 1845 he was called again to the ministry of public instruction in the Guizot cabinet, and made himself unpopular by stopping the lectures of Quinet, Michelet, and Mickiewicz. On the death of Louis Philippe he was foremost among those who supported and brought about a fusion between the two branches of the Bourbon family.

**SALVATOR ROSA**. See **ROSA**.

**SALVERTE**, **ANNE JOSEPH EUSÈBE BACONNIÈRE DE**, a French writer, born in Paris, July 18, 1771, died Oct. 27, 1839. In 1792 he held an office in the ministry of foreign affairs, and in 1793 was appointed professor of algebra in the school of *ponts et chaussées*. He actively

participated in the insurrection of the Parisian sections in 1795, and was sentenced to death by default, but afterward presented himself before the court and had the sentence reversed. Thenceforth he devoted himself to literary pursuits, publishing *Romances et poésies* (1798), and other works. From 1815 to 1820 he resided in Geneva. His *Essais historiques et philosophiques sur les noms d'hommes, de peuples et de lieux* (2 vols., Paris, 1824) and *Des sciences occultes* (2 vols., Paris, 1829) were portions of a projected history of civilization, which was never completed. In 1828 he became an opposition member of the chamber of deputies, and continued in that body till his death.

**SALVI**, **GIAMBATTISTA**. See **SASSOFERRATO**.

**SALZBURG**. See **SALTZBURG**.

**SALZMANN**, **CHRISTIAN GOTTHILF**, a German Protestant clergyman and teacher, born near Erfurt in 1744, died in 1811. He was for some years pastor of a church in the vicinity of Erfurt, and in 1781 became associated with Basedow in his *Philanthropinum*. In 1784 he founded at Schnepfenthal, near Gotha, a house of education, in which he developed and tested the theories of Basedow and Rousseau. He published numerous educational works, and *Carl de Carlsberg*, a romance (6 vols., 1781-'5).

**SAMANA**, a peninsula and bay on the N. E. coast of St. Domingo, West Indies. The peninsula extends from E. to W. 32 m., and is 11 m. wide, terminating in Cape Samana at its W. end, in lat. 19° 18' N., long. 69° 8' W. Sugar Loaf hill, the highest peak, is 1,936 feet above the sea. The choicest timber for ship building and cabinet purposes is found in great abundance. The minerals are copper, gold, and bituminous coal. The peninsula was once an island, but the strip of water separating it from St. Domingo has been filled up by the drifting sands. The bay of Samana lies on the S. side of the peninsula, and is 43 m. long by 8 m. wide. The river Yuma falls into the W. end of the bay. The harbor is one of the finest in the world, and occupies an important commercial and military position. On the N. shore is the town of Santa Barbara, which possesses excellent natural facilities for repairing vessels. In 1853 negotiations were fruitlessly opened with the Dominican republic for the cession of the port of Samana to the United States.

**SAMAR**. See **PHILIPPINE ISLANDS**.

**SAMARA**, an E. government of European Russia, bounded N. E., E., and S. E. by Orenburg, S. by Astrakhan, W. by Saratov, and N. W. by Simbirsk; area, 65,088 sq. m.; pop. in 1856, 1,479,081. The river Volga forms its W. frontier, and it is drained by the Samara, the Irghis, and other affluents of the Volga. The government was erected in 1850.—**SAMARA**, the capital (pop. 11,019), situated near the confluence of the river of that name with the Volga, has an important trade in cattle, sheep, fish, caviar, skins, leather, and tallow.

**SAMARANG**, a province on the N. coast of Java; area, about 1,425 sq. m.; pop. 624,874.



It has numerous rivers, navigable for boats within the limits of the tide. The S. W. boundary is formed by a volcanic range of mountains which rises to the height of 9,000 and 10,000 feet above the sea. Along the sea there is a low alluvial plain. In 1845 the province exported 82,000 cwt. of coffee, 2,500 tons of sugar, and 1,200,000 lbs. of tobacco.—SAMARANG, the capital, is situated near the mouth of the river Samarang, about 253 m. E. from Batavia; pop. about 50,000. Cotton and leather are manufactured. The commerce of the richest provinces of Java centres here.

SAMARCAND (anc. *Maracanda*), a walled town of Bokhara, in Toorkistan, 100 m. E. from the city of Bokhara; pop. from 10,000 to 30,000. Samarcand was the capital of Tamerlane's dominions, and in his time had 150,000 inhabitants; and it was long famous as a seat of Mohammedan learning. It then contained 40 colleges, of which only 3 remain; and most of its mosques are in ruins. Tamerlane's coffin is preserved there.

SAMARIA (Heb. *Shomeron*), a town situated in a district of the same name in middle Palestine, in the tribe of Ephraim, so called after Mt. Samaria, upon which it was founded about 920 B. C. by Omri, the 6th king of Israel. Omri made Samaria the royal residence, and it remained so until the captivity of the 10 tribes. In 721 it was conquered by the Assyrian king Shalmaneser, and peopled with colonists from the Assyrian provinces. In 110 it was besieged, conquered, and razed to the ground by the Maccabæan John Hyrcanus; but it must have been soon rebuilt, for in 104 it is mentioned as a town belonging to the Jewish territory. Augustus gave it to Herod the Great, who embellished it with a temple of Augustus and other new buildings, strongly fortified it, and called it, in honor of the emperor, Sebaste (Angusta). The ancient name of the city however was also retained, and is mentioned in the New Testament. The later history of the town is unknown, but a little village, Sebustieh, with some ruins, still exists on its site. Under the Romans a whole district was also called, after the name of the town, Samaria, forming a separate province between Judæa on the S. and Galilee on the N.

SAMARITANS (Heb. *Shomerim*, later *Cuthim*, Outhæans), the people who sprang, according to the common opinion, after the conquest of the town of Samaria by Shalmaneser, from the mixture of the remaining natives with the foreign colonists from Babylon, Outhah, Ava, Hamath, and Sepharvaim. As they were a mixed race, their religion also assumed a mixed character, the worship of the deities of the pagan colonists being associated with Hebrew rites. In opposition to this view, but more strictly following the biblical narrative (2 Kings, xvii.), Hengstenberg (who has been followed by Hävernick, Robinson, and others) has endeavored to show that the entire Hebrew population of Samaria had been carried away,

that the Samaritan people were wholly of heathen origin, and that the Israelitish worship was established when the colonists asked and obtained from the Assyrian king an Israelite priest, in order to appease the supposed wrath of the national deity by the restoration of his worship. After the return of the Jews from the Babylonian captivity the Samaritans asked permission to participate in the restoration of the temple, but it was refused; and from this event (585) dates the inveterate hostility between the Jews and the Samaritans. The alienation was widened when, toward the close of the 6th century B. C., the Persian governor Sanballat, with the permission of the Persian court, erected for the Samaritans on Mt. Gerizim, near Shechem, a temple of Jehovah, and gave them an independent high priesthood, which was bestowed by him upon his son-in-law Manasses, the son of the Jewish high priest. Alexander the Great took a Samaritan army with him to Egypt, where many of them settled in the Thebaid. The colony received reinforcements from Samaria under Ptolemy Soter, and again at the time of John Hyrcanus, who conquered and destroyed that city, finally crushing the power of the Samaritans in Palestine. Remnants of the Egyptian colony are still extant, and form a congregation at Cairo. In Palestine a few families are found at Shechem, now Nablous. Several attempts have been made by learned Europeans to maintain a correspondence with the remnants of the Samaritans; as by Scaliger in 1559, by several learned men in England in 1675, by the great Ethiopic scholar Ludolf in 1684, and by the distinguished orientalist Sylvestre de Sacy and others. All the letters of the Samaritans written on these occasions, together with an exhaustive essay on their history by De Sacy, may be found in *Notices et extraits des MSS. de la bibliothèque du roi* (vol. xii., Paris, 1831). The best modern accounts of them have been given by the Americans Fisk ("Missionary Herald," 1824) and Robinson ("Biblical Researches," vol. iii.).—The Samaritans recognize, of the books of the Old Testament, only the Pentateuch, rejecting all the other books of the Hebrew canon, together with the traditions of the Pharisees. Of the Pentateuch they have a translation in the Samaritan language, an Aramæan dialect, mixed with many Hebrew forms and words. In the same language are written their rituals and liturgies, and a number of religious songs or psalms. (See Gesenius, *Carmina Samaritana*, in his *Anecdota Orientalia*, Leipsic, 1824.) They have also preserved an ancient Hebrew copy of the Pentateuch, first printed in 1628. It is of great importance to biblical criticism, agreeing with the Septuagint in 2,000 places where that differs from the ordinary Hebrew text. It is written in the old Hebrew characters, closely resembling the Phœnician. When the Arabic became their conversational language, all their Samaritan works were translated into it; and they

have also in Arabic a so called book of Joshua. (See JOSHUA.) We know from the New Testament that the Samaritans, like the Jews, were waiting for a Messiah, who in their later writings is called Hahshaheb or Hattahab, *i. e.*, the Restorer. Their later writings also prove their belief in spirits and angels, in the immortality of the soul, and in the resurrection. They strictly observed the Mosaic ordinances concerning the sabbath, and in general all the prescriptions of the Mosaic law. Able essays on their history, beside that by De Sacy already mentioned, have been written by Knobel (*Zur Geschichte der Samaritaner*, in the *Denkschriften der Giesener Gesellschaft für Wissenschaft und Kunst*, Gießen, 1847), and by Juynboll (*Commentarii Historie Gentis Samaritanæ*, Leyden, 1846).

SAMNIUM, a division of ancient Italy, bounded N. by the territories of the Marsi, Peligni, and Marrucini, N. E. by that of the Frentani, E. by Apulia, S. by Lucania, and S. W. and W. by Campania and Latium, and thus comprising the modern district of Molise with some surrounding parts of northern Naples. The country is very mountainous, being occupied by some of the highest mountain groups of the central Apennines. It was watered by the upper sources of the Sagrus (now Sangro), Tifernus (Biferno), Frento (Fortore), Aufidus (Ofanto), and Volturnus (Vultorno), all of which, except the last, flow into the Adriatic. The principal places were Beneventum (Benevento), Caudium (Ariola)—in the vicinity of which were the narrow passes called Caudine Forks, through which a defeated Roman army had to pass under the yoke in 321 B. C.—Aufidena (Alfidenza), Bovianum (Bojanum), and Æsernia (Isernia). The two first named towns were inhabited by the Caudini, Aufidena by the Caraceni, and the last two by the Pentri. These 3 tribes constituted the principal divisions of the Samnites, a warlike and liberty-loving people of the Sabine race, who conquered the country from the Opicans some time before the foundation of Rome. With this republic the Samnites waged a series of wars, in which Valerius Corvus, Curius Dentatus, Papirius Cursor, Fabius Maximus Rullianus, and other Romans shine as heroes amid frequent calamities and humiliating defeats of their countrymen (343–290 B. C.). The Samnites succumbed after terrible devastations of their country, rose again together with other Italians in the social war (90), and were the last of the allies to yield. During the war of Sylla and Marius they once more tried to recover their independence; but, routed before the capital of their enemies, their army was annihilated, and their country was laid waste and distributed to Roman settlers, the Samnite inhabitants being sold into slavery (82).

SAMOS (called by the Turks *Susam-Adassi*), an island of the Grecian archipelago, belonging to Turkey, separated from the coast of Asia Minor by the strait of Little Bosphorus, and from the island of Icaria by the Great Bosphorus;

length 27 m., breadth 12 m.; pop. about 50,000, nearly all Greeks. The chief town is Chora. There are several good harbors on the coast. The interior is traversed by two mountain ranges, one of which attains the height of 4,725 feet in Mt. Kerkis, the Cercetius Mons of the ancients. Samos was anciently celebrated for its fertility. The olive and vine are extensively cultivated; and the exports include grain, silk, cotton, wine, figs, and oil. The original inhabitants of Samos are supposed to have been Carians and Leleges. The Samians planted several colonies on the shores of the Propontis and Ægean, and early in the 6th century B. C. their navy was the most powerful in Greece. The capital, which stood near the site of the present town of Chora, was at that time one of the finest cities in the world. Polycrates, who reigned between the years 532 and 522 B. C., enriched it with a temple to Juno, artificial moles enclosing the harbor, an aqueduct hewn in solid rock to convey water to the town, and an extensive fortified palace. After his death Samos was subject to Persia for 48 years, when it was liberated by the victory over the fleet of Xerxes at Mycale, a promontory opposite the S. E. coast of the island, and became a member of the Athenian league. It revolted, but was conquered by the Athenians in 439. The Romans made it a free city; and in the middle ages it was taken by the Arabs, who were expelled in the 18th century. During the Greek revolution the Samians expelled the Turks from the island, but by the treaty which secured the independence of other parts of Greece Samos remained subject to Turkey. Since 1835 it has been governed by a Greek, styled "prince of Samos," who resides at Constantinople, ruling by deputy, and pays a certain fixed tribute to the sultan.

SAMOTHRACE (modern Gr. *Samothraki*; Turk. *Semendrek*), an island of the Ægean sea, belonging to Turkey, between Lemnos and the coast of Thrace, and opposite the mouth of the Hebrus (Maritza); area, about 80 sq. m.; pop. 1,500 or 2,000. It is the highest land in the north of the archipelago, and from the peak called Saece by Pliny (now Mt. Fingaree, 5,240 feet high) Homer represents Neptune as viewing the siege of Troy, which was about 50 m. S. E., the high island of Imbros intervening. It is sterile and destitute of ports, and possesses little historical interest except in connection with the mysteries of the Cabiri, which were celebrated here. (See CABIRI.) Its name (Thracian Samos) has been variously explained, but the statement by Pausanias and others of a connection between its people and those of Samos seems to rest only on conjecture. The people of Samothrace were in early times independent, held fortified places on the mainland, and fought bravely in aid of Xerxes at the battle of Salamis. They were afterward subject to Athens, Philip of Macedon, and Rome, which left them to govern themselves till the time of Vespasian.

**SAMOYEDES**, or **SAMOIDES**, a name of unknown origin, applied to a nomadic people inhabiting the northern parts of the Russian empire, both in Europe and Asia. The name, according to Prichard, occurs in the Russian chronicles as early as 1096; but they call themselves *Khasovo* or *Nenetch*, *i. e.*, men. The Samoyedes are classed by Latham with the Finns, Lapps, Ostiaks, &c., in the Ugrian race. They were originally spread N. and S. from the Altai mountains to the Arctic ocean, and E. and W. from the White sea nearly to the river Lena; but several centuries ago they were driven from their best possessions by Mongol tribes. They are still met with in groups from the White sea to the river Khata-tanga, but the space between the Obi and the Yenisei may now be considered their principal seat. Their whole number is estimated at not more than 20,000, divided into several tribes speaking different languages or dialects. They are mostly idolaters, of small stature and repulsive features, but peaceably disposed. They dwell in tents of reindeer skin, and live upon the products of the reindeer and of fishing, gathering also furs and peltries with which they pay their tribute to the Russian government.

**SAMPHIRE** (*crithmum maritimum*, Linn.), a very succulent plant of the natural order *umbelliferae*, with fleshy, bipinnate or tripinnate leaves of a few lanceolate leaflets, and with compound umbels of small white flowers destitute of a true calyx; the seeds oblong and similar to a grain of barley, whence (Gr. *κριθη*, barley) is derived its generic name. The samphire is found upon stone walls, rocks, and rocky cliffs, by the sea shores of Britain, the roots penetrating deep into the crevices by means of their numerous strong fibres. It has been cultivated in sand and rubbish, the soil being dressed in the spring with powdered barilla. Under this treatment two crops of leaves and shoots can be procured in a season. It makes a favorite pickle, very provocative of appetite. —The American samphire, which grows abundantly on salt marshes and near salt springs, and which is sometimes used for the same purpose, consists of the several species of *salicornia*, a genus of chenopodiaceous plants, with succulent, jointed, leafless stems and opposite branches; the flowers are small, sessile, and immersed in the hollows of the swollen upper joints. In the autumn the marshes are rendered brilliant by the deep crimson color of *S. mucronata*, which changes from its usual glaucous green at that season of the year.

**SAMPSON**, a S. E. co. of N. C., bordered W. by South river and drained by Black river and its branches, the Great Colura and Little Colura; area, 940 sq. m.; pop. in 1860, 16,623, of whom 8,095 were slaves. The surface is undulating and the soil sandy but fertile. There are extensive forests of pitch pine. The productions in 1850 were 425,805 bushels of Indian corn and 239,557 of sweet potatoes. There were 51 tar and turpentine manufac-

tories, 2 turpentine distilleries, 24 churches, and 3,817 pupils attending public schools. Capital, Clinton.

**SAMSON** (Heb. *Shimshon*), a judge of Israel, celebrated for his bodily strength and his tragical end. He was the son of Manoah, of the tribe of Dan, and born before the middle of the 12th century B. C. His birth was announced by a heavenly messenger, and, as he was to be a Nazarite from his birth, his mother was directed to conform her own regimen during her pregnancy to the tenor of the Nazarite law. At the age of 20 he began to evince his destination as the deliverer of his people from the power of the Philistines, by the occasional access of superhuman strength. In all 12 great achievements are recorded of him, 7 of which are connected with his love for his Philistine wife, and 5 with his love for two women of loose character. The latter of these, Delilah of Sorek, by blandishments ascertained from him that the secret of his strength lay in his hair, which had never been shorn. Having entered into a plot against him with the Philistines, she shaved his head while he lay sleeping in her lap; he was then arrested by his enemies, deprived of his sight, and made to grind at the mill like a slave. But in the process of time, when his hair grew long, he regained his strength; and on a festival of the Philistines, when an immense multitude were assembled in a large temple, he persuaded his guide to conduct him to a spot where he could reach the two pillars upon which the roof of the building rested. He grasped the pillars and shook them till the building fell, burying the whole assembly, himself included, beneath the ruins. He is said to have been judge of Israel for 20 years; but whether this was before Eli, or simultaneously with him, is not clear. The Epistle to the Hebrews counts him among the heroes of faith in the old covenant.

**SAMSON**, GEORGE WHITFIELD, D.D., an American Baptist clergyman, born at Harvard, Worcester co., Mass, Sept. 29, 1819. He was graduated at Brown university in 1839, and at Newton theological institution in 1843, and was pastor of the 44 street Baptist church, Washington, D. C., till Oct. 1849. In 1847 he spent a year in making the tour of southern Europe, Palestine, and Syria. He received the degree of D.D. from Columbian college, Washington, in 1858, and was elected president of that college in 1859, which position he still holds. In 1848 he published a series of letters on Egypt, Palestine, and Italy, beside several articles on Goshen, Mount Sinai, &c., in reviews; and in 1852 a work entitled *To Daimonion*, republished and much enlarged in 1860, under the title of "Spiritualism Tested." He is also the author of several historical pamphlets and critical essays on art.

**SAMUEL** (Heb. *Shemuel*, "heard of God"), the last of the judges of Israel. He was the son of Elkanah, of Ramathaim-Zophim of

Mount Ephraim, and of Hannah, and was born in the latter part of the 12th century B. C. Even before his birth his mother had bound him to the obligations of a Nazarite, and consequently he was set apart from his early youth to the service of the Lord in the tabernacle at Shiloh, under the immediate tutelage of the judge, Eli. He soon received special prophetic messages from God to his people, the first of which concerned the doom of Eli's apostate house. After this Samuel disappears from history until 20 years after the death of Eli, when he issued a manifesto, urging on the people to remain faithful in the worship of the Lord, and promising them speedy deliverance from the Philistines. At this time he seems to have been himself elected judge, an office which he held for about 20 years, and administered with great energy, restoring everywhere the neglected national worship. The Philistines, the most dangerous foes of Israel, were routed, and did not recruit their strength during the remainder of his administration. The Amorites, the eastern foes of Israel, also remained at peace with him. His dwelling was at Ramah, and in his old age he appointed two of his sons deputy judges at Beersheba. As they "perverted judgment and took bribes," the people became dissatisfied, and demanded a king. Samuel, with great reluctance, at length yielded to this demand, and anointed Saul the first king of Israel. His influence in state affairs continued to be felt; he rebuked Saul on several occasions, and at length, by divine order, anointed David before the demise of Saul as second king. He did not live to see the end of the contest between Saul and David, dying before 1060 B. C. According to Jewish tradition, he was the author of the book of Judges and of a part of the books of Samuel. (See HEBREWS.)

**SAMUEL**, Books of, two canonical books of the Old Testament, anciently reckoned by the Jews as one book. The present division into two books dates from the edition of the Hebrew Bible by Bomberg, and is derived from the Septuagint and Vulgate, in both which versions they are termed the 1st and 2d books of Kings. They consist of 3 connected biographies, those of Samuel, Saul, and David. According to an ancient opinion the first 24 chapters were written by Samuel, the rest by Nathan and Gad. From the circumstance that the death of David is not recorded, though his last words are given, it has been inferred that the books must have been composed prior to the monarch's death, or at least about that period. Other passages, however, as the mention of the kingdom of Judah, point to a later origin. All the modern commentators agree that in the compilation of the books of Samuel several older books have been made use of by the author; but as to the number and character of these sources of information they do not agree. Some writers, as Hobbes, Spinoza, Simon, Le Clerc, Eichhorn, Thenius, and De Wette, have

maintained that the book contains contradictory statements; but their arguments have been answered by Carpzovius, Davidson ("Biblical Hermeneutics"), Hengstenberg, Hävernick, Welte, Keil, and others.

**SAN ANTONIO**, or **SAN ANTONIO DE BEXAR**, the capital of Bexar co., Texas, on one of the head streams of San Antonio river, 110 m. S. W. from Austin; pop. in 1850, 3,488; in 1860, 8,274. It has a U. S. arsenal, and a Methodist, a Presbyterian, and 2 Roman Catholic churches. This town has been the scene of several battles, including the massacre of the Texan patriots of the Alamo in 1836. (See ALAMO.) It is one of the oldest towns in North America, and was originally settled by Spaniards.—The San Antonio river is formed by the Medina and Salado rivers, about 15 m. S. E. of San Antonio, and flows into Espiritu Santo bay after a general S. E. course of about 150 m.

**SAN AUGUSTINE**, an E. co. of Texas, bordered W. by Angelina river and Attoyac bayou, and drained by their branches; area, 530 sq. m.; pop. in 1860, 4,094, of whom 1,717 were slaves. The soil is very rich, and the county is noted for its fine cotton. The productions in 1850 were 1,020 bales of cotton, 115,284 bushels of Indian corn, and 32,400 of sweet potatoes. The capital, San Augustine (pop. 1,500), contains a university, 3 churches, and a Wesleyan college.

**SAN BERNARDINO**, a S. E. co. of California, bordering on New Mexico, bounded E. partly by the Colorado river and S. W. by the coast range of mountains, and drained by the Mohave and San Bernardino rivers; area, over 15,000 sq. m.; pop. in 1860, 5,554. The surface is in many parts rough and mountainous. In the valleys the soil is fertile. Iron, copper, lead, silver, and quicksilver are found. The productions in 1858 were 18,500 bushels of wheat, 24,000 of barley, and 100,000 of Indian corn; and there were 75,000 grape vines, 8 grist mills, and 7 saw mills. Capital, San Bernardino.

**SAN BLAS**, a seaport town of Jalisco, Mexico, on an island at the mouth of the Rio Grande de Santiago, 37 m. S. W. from Tepic, of which it is the port; pop. 3,000. The harbor is indifferent and the climate unhealthy. In 1852 the arrivals of vessels amounted to 32,321 tons.

**SAN DIEGO**, a S. co. of California, bounded E. by the Colorado river, separating it from New Mexico, S. by Mexico, and W. by the Pacific; area, 13,000 sq. m.; pop. in 1860, 4,326. It is intersected by the coast range of mountains. The soil in the level portion is rich; the mountainous regions abound in valuable timber, and gold, silver, lead, copper, and coal are found. The productions in 1858 were 60,000 bushels of barley, 10,500 of wheat, 3,000 of oats, and 20,000 lbs. of grapes.—**SAN DIEGO**, the capital, is situated on a bay of the same name; pop. about 2,000. It was the first civilized settlement in California, and has a Roman Catholic church, 2 or 3 Protestant churches, and a printing office.

SAN FRANCISCO, the chief city of California, capital of the county of the same name, and the principal commercial emporium on the Pacific coast of North America, in lat.  $37^{\circ} 46' N.$ , long.  $122^{\circ} 23' W.$ ; pop. in 1852, 84,870; in 1880, according to the census, 56,805, though it is supposed actually to have amounted to 70,000. It is situated at the N. E. corner of a peninsula which divides the bay of San Francisco from the Pacific ocean. This peninsula is 18 m. wide at the base and 6 m. wide at its N. point. The city stands 6 m. from the ocean, on the E. slope and at the base of high hills. In 1846 these hills were steep and cut up by numerous gullies, and the low ground at their base was narrow, save in what is now the S. part of the city, where there was a succession of hills of loose, barren sand, impassable for loaded wagons. In front of the town of Yerba Buena, as it was called previous to 1847, was a cove extending  $\frac{1}{4}$  m. into the land and 1 m. wide, between the projecting points of land known as Clark's point and Rincon point, which formed its sides. Along the front line of this cove the water was 40 feet deep, and around its edges there were mud flats which were bare at low tide. The sand ridges have been cut away, the gullies and hollows filled up, the hills cut down, and the cove filled in; and where large ships rode at anchor in 1849 are now paved streets. The country around the city is bare, with no trees and little fertile land within 20 m. The greater part of the peninsula is hilly, and unfit for cultivation. There is but one road leading out of the city, and the traveller does not reach a pleasant landscape until he is 12 m. away from San Francisco.—The business streets are built up densely, but beyond that the houses are scattered at considerable intervals, and the settled part of the city may be said to cover an area of 9 square miles. In the N. E. corner of the city is Telegraph hill, 294 feet high; in the S. E. corner Rincon hill, 120 feet; and on the W. side Russian hill, 360 feet. The densely settled streets are in the amphitheatre formed by the three hills. The streets are straight, and run at right angles to each other. In the old survey or northern part of the city, the direction of the streets is with the meridian, and at right angles to it; the width of most of the streets is 50 feet, and the size of the blocks is 275 by 412½ feet. Each block is composed of 6 lots, 50 varas or 137½ feet square, the survey having been made while Mexican-law and Spanish measures prevailed. In the new survey, separated from the old survey by Market street, the streets run N. E. and S. W., and S. E. and N. W., and are 82 feet wide; the blocks are 550 feet square, each composed of 4 lots, 100 varas or 275 feet square. There are 12 squares reserved for public use, but only one of them, called the Plaza or Portsmouth square, is an ornament to the city; the others are either bare, covered with brush, or cultivated in gardens and as yet closed to the public.

Portsmouth square is in front of the city hall, in the centre of the first survey of the city, and is 275 feet square. It is surrounded by an iron fence, is covered with grass plots, and has a few small trees and a marble fountain. Montgomery street contains the principal shops, and is the fashionable promenade; in Front street are the large importing and jobbing houses; Kearny, Washington, Sacramento, Second, and Third are the principal streets for retail trade; Stockton, Powell, Mason, Taylor, Folsom, and Second are the most fashionable for residences; and Sacramento between Kearny and Dupont, and Dupont between Sacramento and Pacific, are the chief resorts for Chinamen. The busiest streets are paved with cobblestones; the others are planked, both in the carriage way and on the sidewalk. These planks are mostly of fir, from 2 to 8 inches thick, and are brought from Humboldt bay and Puget sound. The city is supplied with gas, made from imported coal, and water is brought by two aqueducts, one from Lobos creek, 5 m. W. of the city hall, the other from San Mateo creek, 20 m. S. There are 8 omnibus routes in the city, and a railroad 3 m. long.—In the S. part of the city, 3 m. from the city hall, are the buildings of the old mission of San Francisco. The main structure is the church, which deserves notice only as a relic of early times. It is built of adobe or unburned brick, and was erected in 1778. Four miles W. of the city hall, and on the S. shore of the Golden Gate, as the entrance to the bay of San Francisco is called, is Fort point, the chief defence of the entrance, which is there 1 m. wide. Alcatraz island, which contains another fortification, commanding both the entrance and city, is 2 m. N. from the city hall. The principal public buildings are the U. S. custom house, mint, and marine hospital, the city hall, 3 theatres, 4 hospitals, 2 orphan asylums, and one convent. The city hall is 3 stories high, and has a tasteful front of yellow sandstone; it was built for a theatre, and was purchased by the city in 1852 for \$200,000. The custom house is built on made ground, where the waters of the bay formerly flowed, and stands upon piles, which were driven about 80 feet through soft earth to reach a hard bottom. The foundation of the building cost \$250,000, and the whole structure \$800,000. The metropolitan theatre is one of the largest and handsomest structures of the kind in the United States. According to the city "Directory" for 1860 there were in the middle of that year 10,128 houses in the city, of which 8,603 were of wood, 1,461 of brick, 47 of iron, 6 of adobe, and 6 of stone. Three were of 5 stories, 46 of 4 stories, 414 of 3 stories, 5,794 of 2 stories, and 8,967 of 1 story. All the houses of 5 and 4 stories, and all save 15 or 20 of the 3 story buildings, are of brick; but the great majority of those of 2 stories, and nearly all of 1 story, are of wood. One house is built of granite which was quarried and cut in China. Many

of the brick buildings are covered with mastic. A considerable proportion of the brick stores are fire-proof, with iron doors and window shutters, and roofs of brick laid in mortar.—The city has 12 daily and 12 weekly newspapers, and 4 monthly magazines. Of the dailies, 7 are published in the morning and 5 in the afternoon; 8 are English, 2 French, and 2 Spanish. Of the weeklies, 1 is Methodist, 1 Southern Methodist, 1 Congregationalist, 1 Roman Catholic, 1 Jewish, 1 agricultural, 1 military, and 1 devoted to mining. There are 25 churches, viz.: 3 African, 1 Baptist, 1 Congregational, 4 Episcopal, 2 Jewish, 4 Methodist, 8 Presbyterian, 6 Roman Catholic, and 1 Unitarian. The total number of communicants in the Protestant churches is about 1,000. The Chinese Catholics are attended by a priest of their own nation educated in Rome. There are 26 common schools, sustained entirely by public funds; and during the year ending July 1, 1860, they had an average daily attendance of 2,830. The whole number of children in the city between the ages of 4 and 18 is 7,776. Of the 26 schools, one is a high school, another a school for pupils of African blood, one for Chinese children, and 2 evening schools, one of the last being for foreigners. There are 67 teachers, the principals (men) of the grammar schools receiving \$200 per month, the first assistants (women) \$105, and the second assistants \$95. The schools are said to be equal to any public schools in the United States. Their cost during the year ending July 1, 1861, was \$114,000. There are about 3,000 children attending private schools. The Germans, French, Swiss, Italians, Spanish Americans, Scandinavians, Illyrians, German Jews, Polish Jews, and Irish have each a mutual benevolent society. The Chinese have 3 or 4 societies which take care of their own sick. The German and French benevolent societies have each a hospital. The masons, odd fellows, and independent order of knights have lodges in San Francisco; the odd fellows have a large hall, and the masons have commenced the erection of a fine building, the upper part of which is to be occupied by lodges. There is no almshouse in San Francisco, nor is there any public provision for paupers, who are few in number. Persons are sometimes seen begging, but it is scarcely an exaggeration to say there are no genuine beggars in the city. There is a city hospital, which during the year ending July 1, 1861, had an average daily number of 160 patients, and was maintained for the year at an expense of \$38,591.—Details of the census of 1860 have not been published; of the estimated number of 70,000 inhabitants, 40,000 are probably Americans, 12,000 Irish, 5,000 Germans, 4,000 British, 3,000 French, and 2,000 Chinamen. The number of Spanish Americans is small. Among the Chinese there are very few women. There are probably 3 adult men in the city to one adult woman. The city "Directory" for 1860 reported that there were

in July of that year 800 grog shops, 373 groceries, 288 lawyers, 276 tailor shops and clothing stores, 248 boarding houses, 189 physicians, 179 brokers, 150 butchers, 186 cigar shops, 121 dry goods stores, 120 carpenter shops, 95 barbers and hair dressers, 84 restaurants, 33 lumber yards, 24 breweries, 17 banks, and 8 assay offices.—The chief business of the city is commercial. The principal manufacturing establishments are 2 woollen mills, 1 sugar refinery, 1 rope walk, 9 flour mills, 2 mills for cleansing rice, 4 steam saw mills, 1 establishment for making nitric and sulphuric acids, and 8 iron foundries. In 1860, 1,686 vessels measuring 500,000 tons entered the harbor, 325 from foreign ports, 1,231 from American ports on the Pacific, 115 from American ports on the Atlantic, and 15 from whaling voyages. The exports in 1860 amounted to about \$50,000,000, of which \$42,303,345.18 was in bullion, \$2,500,000 in wheat and flour, \$416,000 in silver ore, \$316,000 in quicksilver, \$152,000 in barley, \$119,000 in oats, \$94,000 in timber, and \$30,000 in wine. Among the imports of the year were 52,000 kegs of butter, 150,000 boxes of candles, 50,000 boxes of soap, 50,000 boxes of boots and shoes, 70,000 tons of coal, and 100,000 kegs of nails. Of timber, 75,518,947 feet were discharged at the wharfs, 36,227,000 feet from Puget sound, 32,803,000 feet from various parts of California, and 6,488,947 from the Columbia river. The freights paid on goods imported amounted to \$4,110,050. Six ocean steamers, most of them measuring 2,000 tons or more, are employed between San Francisco and Panama, leaving each port 3 times a month. Steam communication between San Francisco, Portland, Victoria, and Olympia is maintained by 3 ocean steamers. One ocean steamer runs to Mazatlan, and 2 run to San Pedro in the southern part of the state. Four steam ferry boats run to Oakland, and steamboats run to Sonoma, Napa, Suisun, Alviso, Petaluma, Sacramento, and Stockton.—The local government of the city and county is under the charge of a board of supervisors and a mayor, with powers very closely restricted. The annual expenses of the city government are about \$700,000, of which about \$300,000 goes to the interest and sinking fund of a debt of \$3,000,000. The assessed value of property in the city is \$35,000,000, and the total direct tax for the year 1861 was \$2.85 per cent. on the assessed valuation of the taxable property.—The mission of San Francisco de Assisi, frequently called the mission Dolores, was founded Oct. 9, 1776, by two Franciscan monks, Francisco Palou and Benito Cambon, both natives of Spain. Their establishment grew, and in 1825 it had 76,000 head of neat cattle, 79,000 sheep, 3,084 horses, 18,000 bushels of wheat and barley, merchandise worth \$35,000, \$25,000 in cash, and about 1,800 Indians. For 58 years the missionaries had complete control of the mission, and it prospered without interruption until in 1834 the missions

of California were secularized and given over to civil officers. Their downfall was then most rapid. In a few years nothing remained save the adobe buildings, and they would not have been left if any profit could have been made by carrying them away. One of the first effects of the new policy of secularizing the missions, placing the country under the control of the civil powers, and encouraging colonization, was the establishment of the village of Yerba Buena, which was situated near the present site of the city hall. The first house was erected in 1835, and others followed slowly. The first survey of streets and town lots was made in 1839. A small trade was done in exporting hides, selling wheat to the Russians, furnishing supplies to whalers, and trading with the *rancheros* in the neighborhood. Very few vessels entered the harbor, and those which came usually anchored either at Saucelito or near the *presidio* or fort. In midsummer of 1846 an American man-of-war entered the harbor, and took possession of the place in the name of the United States. The town was known only as Yerba Buena until Jan. 30, 1847, when the *ayuntamiento* or town council changed it to San Francisco. In the next month a census was taken, and showed a population of 459 persons. Gold was discovered in the spring of 1848, and the town was deserted by many of its inhabitants from June to October; but the return of the adventurers in the autumn, the arrival of others from abroad, the increase of shipping, the abundance of money, and the profits of trade soon built up a city, and in 1849 San Francisco had become a great centre of commerce. Such rapidity of growth was never before seen. But the houses were crowded together and built of combustible materials, and several great fires occurred; the first was on Dec. 24, 1849, and the estimated loss was \$1,000,000; the next was on May 4, 1850, loss \$3,000,000; the third on June 14 of the same year, loss \$3,000,000; the fourth on May 2, 1851, loss \$7,000,000; the fifth on June 22, 1851, loss \$3,000,000; making a total of \$16,000,000 lost by fire within 18 months in a city whose population did not then exceed 30,000. These fires scarcely interrupted the prosperity of the place, so great was its business. Its growth continued to advance until Jan. 1854, when a decline commenced, and the value of land continued to fall until Aug. 1858, when it again began to rise, and the second era of prosperity is not yet at an end. The importations of grain, flour, salt meats, and vegetables, which in 1853 amounted to \$14,000,000, had fallen in 1857 to \$1,500,000, because these things were now produced at home; so that, though much money was saved to the state, the commerce of the chief port suffered severely. In 1851 and 1856, in consequence of the bad management of the municipal government and the corrupt administration of the criminal laws, the people organized a vigilance committee, and executed several criminals. (See CALIFORNIA.)

**SAN JACINTO**, a river of Texas, rising in Walker co. and flowing S. S. E. into San Jacinto bay, an arm of Galveston bay; length about 100 m., of which 45 m. are navigable. It is very deep, pure, and clear. Near the mouth of this river, on April 21, 1836, was fought the battle of San Jacinto, which decided the independence of Texas. (See HOUSTON, SAM.)

**SAN JOAQUIN**, a river of California, which rises in the Sierra Nevada mountains and flows in a S. W. direction to its confluence with the outlet of Lake Tulare, and thence N. W., receiving numerous tributaries from the Sierra Nevada, to the Sacramento river, which it joins about 50 m. from San Francisco bay. Its principal tributaries are the Mariposa, Merced, Tuolumne, Stanislaus, Calaveras, and Mokelumne rivers. Its entire length is about 850 m., and it is navigable for large vessels to Stockton, and for smaller craft to the mouth of the Tuolumne river.

**SAN JOAQUIN**, a middle co. of California, intersected by the San Joaquin river, bounded N. by the Mokelumne and S. E. by the Stanislaus; area, 1,452 sq. m.; pop. in 1860, 9,434. It has a diversified surface, about 420 sq. m. being swamp and the rest upland. The productions in 1855 were 300,000 bushels of wheat, 600,000 of barley, 40,500 of oats, 15,750 tons of hay, 49,733 lbs. of wool, 42,043 of butter, and 28,000 of cheese. There were 8 grist mills (6 running by steam), 3 saw mills, and 5 tanneries. Capital, Stockton.

**SAN JOSE**, the capital of Santa Clara co., Cal., and formerly of the state, 50 m. S. E. from San Francisco; pop. about 3,000. It is situated in Santa Clara valley, 7 m. from the head of San Francisco bay, on which it has many small vessels. It has two newspapers. The New Almaden quicksilver mines are near this place to the S.

**SAN JOSÉ**, the capital of Costa Rica, Central America, situated on the river Cartago, 248 m. W. by N. of Panama; pop. 16,000. It contains a cathedral, an episcopal palace, and the governmental buildings, and the trade of the city is active and important. It owes its origin to the earthquakes which nearly destroyed the neighboring town of Cartago 70 years ago. It is built on table land at an elevation of 4,500 feet above the level of the sea. Its seaport is Punta Arenas on the gulf of Nicoya.

**SAN JUAN DE NICARAGUA**, **SAN JUAN DEL NORTE**, or **GREYTOWN**, a port of Nicaragua, at the mouth of the river San Juan, on the Caribbean sea, in lat. 10° 56' N., long. 83° 45' W.; pop. about 600. It derives its chief importance from being the principal port of Nicaragua on its E. coast, and from being the only possible terminus, on the Atlantic side, for the proposed interoceanic canal by way of the river San Juan and the Nicaraguan lakes. It was made a port of entry by the king of Spain in 1796, and was continued as such under the re-



publics of Central America and Nicaragua until Jan. 1848, when it was occupied by a British force under pretence that it belonged to the so called Mosquito kingdom. In 1853, after the establishment of the Nicaragua transit, the citizens declared it a free city, and organized a municipal government, which it still retains, although by the treaty negotiated between Nicaragua and Great Britain in 1860 it is secured to Nicaragua. It was bombarded and burned by a naval force of the United States in 1854, on a charge that its inhabitants had infringed the rights of the transit company. Since then the harbor has become so choked with sand as to be valueless.

**SAN JUAN DE PORTO RICO**, a fortified city of Porto Rico, of which it is the capital, on a small island off the N. coast, in lat.  $18^{\circ} 29' N.$ , long.  $66^{\circ} 7' 2'' W.$ ; pop. 11,000. The public buildings are the old government house, the royal military hospital, the bishop's palace and seminary, a large cathedral, an arsenal, custom house, city hall, &c.

**SAN JUAN DEL SUR**, a port of Nicaragua, Meridional department, on the Pacific coast, 24 m. S. W. from the city of Nicaragua, of which it is the nearest harbor. It was at one time the western terminus of the Nicaragua interoceanic transit route.

**SAN JUAN RIVER**. See NICARAGUA.

**SAN LUCAR DE BARRAMEDA**, a city of Andalusia, Spain, 18 m. N. from Cadiz, on the left bank of the Guadalquivir, in lat.  $36^{\circ} 45' N.$ , long.  $6^{\circ} 21' W.$ ; pop. 16,861. It was taken from the Moors in 1264, and is the residence of the captain-general of Andalusia. Columbus made his third voyage from this place, May 30, 1498.

**SAN LUIS OBISPO**, a S. W. co. of California, bounded W. by the Pacific and E. by the Coast range, and drained by the head waters of Salinas or Buenaventura river; area, about 3,000 sq. m.; pop. in 1860, 1,782. The surface is partly mountainous, and the soil fertile. Gold, silver, coal, and limestone are found; there are bituminous springs, and a celebrated warm sulphur spring. The productions in 1858 were 15,000 bushels of wheat and 10,000 of barley, and there were 10,000 grape vines. Capital, San Luis Obispo.

**SAN LUIS POTOSI**, a state of Mexico, bounded N. E. by New Leon, E. by Tamaulipas and Vera Cruz, S. by Queretaro and Guanajuato, and W. and N. W. by Zacatecas; area, 27,194 sq. m.; pop. 390,360. In the S. E. the surface is flat, but in other directions it becomes broken and hilly, terminating in mountains and a high table land in the W. The most important rivers are the Santander and Tampico. Large crops of wheat, maize, and barley are raised, and great numbers of cattle are reared. There are several copper mines. The manufactures include woollen and cotton goods, glass, leather, earthenware, and hardware.—**SAN LUIS POTOSI**, the capital, is situated 6,350 feet above the sea, 92 m. S. E.

from Zacatecas, and 190 m. W. from Tampico; pop. 33,581. It has 6 handsome churches, 3 convents, a hospital, a government house, and several schools, and manufactories of shoes, hats, and hardware. Some trade in the above mentioned articles is carried on with the neighboring states, and in foreign imports from the port of Tampico.

**SAN MARINO**, a republic in N. E. Italy, the smallest and oldest state in Europe; area, 24 sq. m.; pop. in 1858, 8,000. It is surrounded by the former papal provinces of Forli and Urbino e Pesaro, is entirely mountainous, and has 4 or 5 villages. It was settled in 469 by Marinus, a Dalmatian hermit, who, obtaining a grant of territory, was joined by others, and established a community whose independence has remained undisturbed through all subsequent changes in Europe. The legislature consists of a council of 60, taken equally from the ranks of nobles, burgesses, and small proprietors, and appointed for life by the councillors themselves. An executive body of 12 is selected from this number; two presidents (*capitani reggenti*) are chosen every 6 months, and justice is administered by two foreign magistrates appointed for 3 years. The republic produces wine, silk, and fruits.—**SAN MARINO**, the capital (pop. 6,000), is situated on the summit of a rugged mountain, and contains a cabinet of antiquities, a theatre, 2 convents, a town house, and a statue in memory of Marinus.

**SAN MATEO**, a W. co. of Cal., bordering on the Pacific, and bounded N. E. by the bay of San Francisco; area, 200 sq. m.; pop. in 1860, 3,214. The surface is hilly and well timbered, and the soil fertile. The productions in 1858 were 150,000 bushels of wheat, 200,000 of barley, 10,000 of oats, 179,620 of potatoes, and 13,000 lbs. of butter. There were 10 saw mills and 2 shingle factories. Coal of excellent quality is found, and there are mineral springs of sulphur and iron. Capital, Redwood City.

**SAN MIGUEL**, a city of San Salvador, Central America, capital of a department of the same name, situated in a broad and fertile plain, in lat.  $18^{\circ} 25' N.$ , long.  $88^{\circ} 15' W.$ ; pop. in 1859, 19,700. It is the seat of commerce for the port of La Union, and the most important trading town in Central America. The great fair of La Paz held here every year attracts as many as 15,000 strangers, and business to the amount of \$2,000,000 is then transacted. About 5 m. W. of the city is a volcano of the same name, 6,680 feet in height, rising abruptly from the plain. It sends out constantly great volumes of smoke, and vast fissures occasionally open in its sides, from which flow currents of lava to a distance in some instances of 6 or 7 miles. One of these lateral eruptions took place in 1848, and another in 1855.

**SAN MIGUEL**, EVARISTE, a Spanish general, born in the Asturias in 1780. He entered the army in 1808, became a lieutenant-colonel, and on the success of the liberals was elected a member of the cortes from Cadiz. After the

restoration of Ferdinand VII. he edited a liberal paper, *El espectador*. In 1820 he was chief of the staff of Riego in the Andalusian expedition, and at this time composed the "Hymn of Riego," one of the most celebrated of the national songs of Spain. Exiled to Zamora in 1821, and recalled on the reestablishment of the liberals in 1822, he was made minister of foreign affairs, rejoined the army on the French invasion, and in 1823, in an engagement with the French cavalry, was wounded and taken prisoner. He was released soon after, on the condition of expatriating himself, and resided in England till 1834. Under the proclamation of a general amnesty, he then returned, was appointed military governor of Aragon, and elected to the cortes, and maintained his position amid all the changes of the following 10 years. He opposed alike the regency of Espartero and the dictatorships of Narvaez and San Luis. In July, 1854, he was made president of the revolutionary junta of Madrid. The queen appointed him captain-general of the city and minister of war, and for some time he was provisional president of the cortes. Since 1857 he has been a member of the senate. He has written a "Narrative of the Expedition of Riego" (Paris, 1820), "Elements of the Art of War" (2 vols. 8vo., London, 1826), and "The Civil war in Spain" (Madrid and Paris, 1836).

**SAN PATRICIO**, a S. co. of Texas, bounded N. E. by the Aransas river, S. W. by the Nueces, and S. by the gulf of Mexico; area, 2,720 sq. m.; pop. in 1860, 620, of whom 95 were slaves. In the N. the land is elevated and broken, and in the S. level and fertile. Capital, San Patricio.

**SAN PETE**, a co. of Utah territory, extending from the Rocky to the Wahsatch mountains; area, over 20,000 sq. m.; pop. in 1850, 365. It is crossed near the centre by Green and Grand rivers, and the Utah river rises in its N. W. corner. Capital, Manti.

**SAN SABA**, a N. W. co. of Texas, formed since 1850, bounded N. and E. by the Colorado, and intersected by the San Saba river; area, about 600 sq. m.; pop. in 1860, 913, of whom 89 were slaves. The surface is partly mountainous. There are sulphur springs in the S. E. part. Capital, San Saba.

**SAN SALVADOR**, a republic of Central America, between lat. 13° and 14° 10' N., and long. 87° and 90° W. It is bounded N. and E. by Honduras, S. by the Pacific ocean, and W. by Guatemala; area, about 9,600 sq. m. It is divided into the following departments:

Departments.	Population.	Capitals.
San Miguel.....	80,000	San Miguel.
San Vicente.....	49,730	San Vicente.
La Paz.....	24,294	Sacatecoluca.
Chalatenango.....	24,918	Chalatenango.
Cuscatlan.....	84,938	Suchitoto.
San Salvador.....	69,168	San Salvador.
Sonsonate.....	84,848	Sonsonate.
Santa Ana.....	67,844	Santa Ana.
Total.....	874,215	

The principal ports are La Union, on the bay  
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of Fonseca, La Libertad, and Acajutla. The last two however are unprotected, and derive their importance from their proximity to the cities of San Salvador and Sonsonate. Along the coast there is a belt of low, rich, alluvial land, varying in width from 10 to 20 m.; beyond which, and presenting an abrupt face seaward, rises a broad plateau or coast range with an average elevation of about 2,000 feet. Between this range and the great chain of the Cordilleras, which bounds the republic on the N., lies a broad fertile valley from 20 to 30 m. wide and more than 100 m. long, drained by the river Lempa. A considerable basin is also formed by a system of small rivers which rise in the western part of the republic, at the foot of the volcano of Santa Ana, and fall into the sea near the port of Acajutla; and another and still larger basin is that of the Rio San Miguel in the E., separated only by detached mountains from the bay of Fonseca. The Rio Paza or Pazaca, forming the boundary between the republic and Guatemala, and the Rio San Miguel, are the only remaining streams of importance. San Salvador has two considerable lakes, one in the N. W. part of the state called Guija, and another very nearly in its centre, named Ilopango or Cojutepeque. The former is about 90 m. in circumference, and abounds in fish, the traffic in which is a source of considerable profit to the people on its shores. According to tradition, the lake was formed by an eruption of the neighboring volcanoes of San Diego and Masatepeque. On one of the islands of this lake are the remains of an ancient aboriginal town, called Zacapula. Lake Ilopango contains a species of small fish called *mojarras*, highly prized by the people of the city of San Salvador. (See Ilopango.) Sixteen volcanoes crown the plateau or coast range, extending nearly in a right line from N. W. to S. E., as follows:

Name.	Altitude.	Name.	Altitude.
Apeneca.....	5,820 feet.	San Salvador.....	7,376 feet.
San Juan.....	..	Cojutepeque.....	5,700 "
Launila.....	..	San Vicente.....	7,500 "
Agulla.....	..	Tecapa.....	5,200 "
Naranjo.....	..	Usulután.....	4,250 "
Taurisque.....	..	Chinameca.....	4,730 "
Santa Ana.....	6,615 "	San Miguel.....	6,630 "
Izalco.....	4,060 "	Conchagua.....	4,800 "

Only those of Izalco and San Miguel are active. There are also some others of less note, beside numerous extinct craters, some of which are filled with water, and various volcanic vents called *infernillos*. The most remarkable of these is that of San Vicente, at the N. base of the volcano of the same name, which throws out hot water, steam, and smoke, with a loud noise. Near the frontiers of Guatemala, in the neighborhood of the town of Ahuachapan, are remarkable hot springs called *ausoles*, which emit a dense white steam from a semi-fluid mass of mud and water, throwing to the surface large bubbles 3 or 4 feet high. The sediment deposited from these springs, in the form of a fine clay, is of various shades, and was used by the Indians to color their pottery.

—San Salvador is essentially an agricultural state. The basin of the river San Miguel, that of Sonsonate, and the valley proper of the Lempa, as also the alluvions bordering on the Pacific, are of extraordinary fertility. Around the bay of Jiquilisco and the port of La Libertad cotton has been cultivated with success; but up to this time the principal products of the state have been, in the order of their importance, indigo, sugar, and maize. Indigo is produced from an indigenous, triennial plant, known by the Indian name of *jiquilite*. (See JIQUILITE.) The amount of indigo produced in the republic ranges from 8,000 to 13,000 ceroons, of 150 lbs. each, annually. The amount exported in 1858 was 10,903 ceroons, and in 1859 11,957 ceroons, valued at \$1,762,030. The sugar of San Salvador is of fine quality, with remarkably large and hard crystals, from an indigenous variety of cane, but it is chiefly used for home consumption. The exportation for 1859 was 3,702,800 lbs. Cacao was anciently grown in large quantities near the cities of Sonsonate and San Vicente, and had great fame throughout all Spanish America; but its cultivation is now insignificant. Tobacco of good quality is produced for domestic use in all parts of the republic; and maize, and in the more elevated grounds wheat, barley, potatoes, and other fruits of the temperate zone, are cultivated in great perfection. That part of the coast extending from Acajutla to La Libertad is known as Costa del Balsimo, from the circumstance that here is produced the balsam of Peru. (See BALSAM.)—The geological conditions of San Salvador preclude the existence of the precious metals, except in those portions of the state bordering on Honduras. Here, but particularly in the N. E. part of the republic, in the department of San Miguel, are rich silver mines, of which that of Tabasco is most celebrated. The ores are what are called "lead ores," easily worked, and yield from 47 to 2,537 oz. to the ton. Near the village of Petapa, in the department of Santa Ana, are mines of iron, which produce a remarkably pure and malleable metal, capable of conversion into fine steel. The amount smelted does not however exceed 700 tons per annum. Brown coal occurs, particularly in the valley of the Lempa.—The climate of San Salvador is generally salubrious, although its temperature, owing to its less average elevation, is probably higher than that of Guatemala, Honduras, and Costa Rica. The heat is never oppressive, except at a few points near the coast. The seasons are well defined, the wet season commencing in May and terminating in November. During the rest of the year the sky is cloudless and serene, the amount of rain fall being less than in any of the adjacent states.—Of the total population of San Salvador, probably one fifth are whites, or have a preponderance of white blood; one third are pure Indians, and the remainder *ladinos* or persons of mixed white and Indian blood. The number of ne-

groes and mulattoes is insignificant. The Costa del Balsimo is entirely inhabited by Indians, who also greatly preponderate in the district of Izalco, and in the department of La Paz, between the volcano of San Vicente and the sea. These are all of the Nahuatl or Aztec stock, and were known to the conquerors as Pipils. They retain the Nahuatl language, very slightly modified from that which was spoken on the plains of Anahuac. On the Balsam coast they preserve their primitive habits and modes of life, in great part their ancient forms of government, and also some of their heathen rites, though they profess to be Roman Catholics. Under the constitution of the state they are entitled to equal political rights with the other inhabitants; but on the occasion of every general election they depute one of their old men to visit the capital, and inquire of the actual government for whom to cast their votes.—The trade of San Salvador is chiefly carried on by means of fairs established by the government in convenient parts of the state. The principal are held at Chalatenango, San Vicente, and San Miguel. The last named is the most important. It continues about two weeks, and attracts buyers from nearly every port on the Pacific coast, as well as from England, Germany, France, Italy, and the United States. Almost the only product given in exchange for foreign merchandise is indigo. The imports of the state for the year 1859 amounted to \$1,806,278, and the exports to \$1,991,650.—The constitution confers the right of voting on all male citizens over 21 years of age; but this right is forfeited by all who are without a legal occupation, who become domestic servants, who enter the service of a foreign power, who are of notoriously bad character, who contract debts fraudulently, or who owe money past due to the state. Foreigners can become naturalized after 5 years' residence, or at the end of 3 years in case of contracting marriage with a native. No ecclesiastic can hold any government office, and military men while in active service are precluded from discharging any civil or political function. The president must be not less than 32 years of age and not over 60, and must possess property to the value of \$8,000; a senator must be 30 years of age, with property to the amount of \$4,000; a representative 23 years of age, with property valued at \$500. The legislature consists of two chambers, a senate and house of representatives, and its sessions are limited to 40 days. The house is elected annually, the senate one half every second year. The president must have an absolute majority of the popular vote; if no candidate receives this, the legislature chooses between the two candidates having the highest number of votes. His term, by the act of Jan. 24, 1859, is for 6 years, and he cannot be elected for two consecutive terms. Each department has a governor, whose term is for 2 years. The standing army of the state is limited to 2,000.

men.—The Roman Catholic religion is that recognized by the state, but the private exercise of all other forms of worship is guaranteed by law. Education is better fostered than in some of the neighboring republics, and every village of 50 inhabitants is required to support a public school; but this regulation is often evaded. There are select or high schools in several of the principal towns, and there is a university in the capital, which is very well endowed by the state. The revenues of San Salvador are derived from duties on imports, stamped paper, and the proceeds of the government monopolies of tobacco and *aguardiente* (rum). The receipts and expenditures for the fiscal year ending Sept. 30, 1858-'9, were as follows:

Years.	Receipts.	Expenditures.
1858 .....	\$725,975	\$680,794
1859 .....	745,959	649,874

The foreign debt of the state is only the proportion of the federal debt of the old republic of Central America, which it assumed when the republic broke up in 1839, amounting to \$220,000, with accumulated interest.—The aboriginal name of San Salvador was Cuscatlan, a Nahuatl word signifying land of riches. The early chroniclers describe the country as one of the best peopled in all America, with large towns well built, and in all respects equal to those of Mexico. It was reduced, after much hard fighting, by Pedro de Alvarado, the lieutenant of Cortes, in 1524, and in 1528 his brother Jorge de Alvarado laid the foundation of the city of San Salvador, on the site of the Indian town of Cuscatlan. Under the Spanish crown the province was ruled by a *gobernador intendente*, and was one of the most flourishing portions of what was known as the kingdom of Guatemala. The movement for independence which took place in the city of Guatemala in 1821 was promptly seconded in all the principal towns of San Salvador, and its emancipation was effected with scarcely a blow. The ancient province now assumed the rank of a sovereign state, and as such sent its delegates to the constituent assembly, which organized the states of Guatemala, Honduras, San Salvador, Nicaragua, and Costa Rica, as the confederated republic of Central America. The attempt of the reactionary party of Guatemala to incorporate the new republic with the Mexican empire of Iturbide, and which for a time broke up the republic, was nowhere resisted with such energy as in San Salvador; but for a time the state was obliged to submit. Its congress however, although driven from place to place, nevertheless remained intact, and by formal act on Dec. 2, 1822, decreed its annexation to the United States. Before any action took place on this proposition in the United States, the empire of Iturbide fell, and the Central American republic revived, the city of San Salvador becoming its capital. On the dissolution of the republic in 1839, San Salva-

dor was the last to resume an independent sovereignty, nor was it until 1856 that it took the title of a republic. In all the commotions which have harassed Central America, San Salvador, from its geographical position and political tendencies, has been obliged to take an active part; but its influence has always been in favor of civil and religious freedom.

SAN SALVADOR, the capital of the republic of the same name, situated near the S. base of the volcano of San Salvador; pop. about 15,000. It was founded by Jorge de Alvarado in 1528, at a place about 6 leagues N. of its present site, called Las Bermudas, and was removed to the spot it now occupies in 1539. Under the crown it was the capital of the province, and afterward of the republic of Central America until its dissolution in 1839. In 1853 it contained about 30,000 inhabitants, a large and beautiful cathedral, 8 other churches, a university, a female seminary, several hospitals, and two considerable aqueducts for supplying the city with water. Its trade was large and increasing. On the night of April 16, 1854, it was completely destroyed by an earthquake, and about 100 lives were lost. A new city was laid out by the government, 10 m. nearer the sea, and called Nuevo San Salvador; but so large a proportion of the inhabitants preferred to rebuild their ruined houses, that in Jan. 1855, the legislature reinstated the old city as the seat of government.

SAN SALVADOR, GUANAHANÍ, or CAT ISLAND, one of the larger islands of the Bahama group, 28 m. E. S. E. from Eleuthera, 46 m. long and from 3 to 7 m. broad; pop. about 1,000. There is good anchorage on the S. W. side, but the E. side is bordered by a reef. It was the first land of the new world seen by Columbus, Oct. 12, 1492, and by him it was named San Salvador.

SAN VICENTE, a city of San Salvador, and capital of a department of the same name, situated in a fertile valley at the N. E. base of the volcano of San Vicente; pop. in 1859, 18,540. It has hot and mineral springs in its vicinity. The volcano, 7,500 feet high, has several craters or great cavities near its summit, in which the water sometimes collects in such quantity as to break through their sides, and pour down in an overwhelming flood. Such a flow of water took place Oct. 18, 1852.

SANA, or SANAA, a walled town of Arabia, capital of Yemen, situated in a deep valley 4,000 feet above the sea, near the head of the river Shab, 150 m. N. E. by N. from Mocha; pop. about 70,000. It contains two palaces of the imam, a castle, state prison, mint, numerous beautiful minarets, about 20 mosques, many of them with gilt domes, and several large caravansaries. Rain falls only in January, June, and July, and sometimes fails altogether for several successive years. The climate is comparatively cool, and in winter even severe. Sana is the centre of the coffee country of Yemen. Very little coffee is used for home

consumption, but the favorite beverage, called *kashr*, is an infusion of the husk, and the coffee husk in consequence sells for a higher price than the berry. The Mohammedan merchants are generally wealthy and live in good style, and there are several rich Hindoo or Banyan traders, and about 3,000 Jews.—Sana is a place of very great antiquity, and is considered one of the most interesting cities of Arabia. The ruins of a castle, said to have been built by Shem, stand on the summit of Mount Nikam, and the city itself is supposed to have been anciently called Uzal or Ozal, after its founder, a descendant of Shem. The Jewish quarter until modern times preserved the name of Ozer. Few remains of antiquity are found, as building materials are so valuable that the stones are removed to be used for other purposes.

SANCHEZ, FRANCISCO, commonly called EL BROENSE, a Spanish scholar, born at Las Broças, Estremadura, in 1523, died in 1601. He was professor of rhetoric at Salamanca from 1554 till 1593, and also taught Greek and Latin. He edited Persius, Pomponius Mela, parts of Virgil and Horace, and other classic authors, and wrote several works on grammar, commentaries on various Spanish poets, &c.

SANCHEZ, FRANCISCO, a French physician and sceptical philosopher, of Jewish descent, born at Tuy on the frontier of Portugal, died in 1632. He was graduated M.D. at Montpellier in 1573, and taught philosophy for 25 years at Toulouse, and medicine for 11 years. His medical and philosophical works were published collectively under the title of *Opera Medica* (Toulouse, 1636).

SANCHEZ, TOMAS, a Spanish theologian, born in Cordova in 1551, died in Granada, May 19, 1610. He became a Jesuit at the age of 16, filled various positions, and was finally made director of the novitiate at Granada, whither his reputation as a casuist drew many visitors from all parts of Spain and Italy. He wrote *Disputationes de Sancto Matrimonii Sacramento* (fol., Genoa, 1592), an extensive manual for confessors, which has excited many animadversions from the minuteness with which the subject is treated; *Opus Morale in Præcepta Decalogi* (Madrid, 1613); and *Consilia, seu Opuscula Moralia* (Lyons, 1634-'5).

SANCHEZ DE AREVALO, RODRIGO, commonly called RODERICUS SANCTIUS, a Spanish prelate, born in the diocese of Segovia in 1404, died in Rome, Oct. 4, 1470. He received various ecclesiastical preferments, was employed in the diplomatic service of Castile, and having settled at Rome was made successively governor of the castle of St. Angelo, and bishop of Zamora, Calahorra, and Palencia, though continuing to reside at Rome. He wrote a treatise on morals, *Speculum Vitæ Humana* (fol., Rome, 1468), one of the earliest specimens of printing in Italy; *Compendiosa Historia Hispanica* (4to., Rome, 1470; reprinted in Schott's *Hispania Illustrata*, Frankfort, 1603); and *Liber de Origine ac Differentia Principatus*,

&c. (Rome, 1521), a defence of the doctrine of the pope's supremacy over all other sovereigns. Many of his unpublished manuscripts are preserved in the Vatican library.

SANCHONIATHON, or SANCHUNIATHON, the name prefixed, as that of the author, to a history of Phœnicia and Egypt published by Herennius Philo of Byblus as a Greek translation from the Phœnician. Philo, a grammarian who flourished in the early part of the 2d century of the Christian era, represents Sanchoniathon to have been a native of Berytus, a Phœnician town a few miles N. of his own native place, and to have written in the time of the Assyrian queen Semiramis, dedicating his work to Abibalus, a national king of Berytus. Of this work a considerable fragment is preserved in Eusebius, who quoted Sanchoniathon as an historical evidence in corroboration of certain biblical statements, which Porphyry had assailed with the same weapons. It is now, however, after much learned controversy on the subject, the belief of most critics that the so called history of Sanchoniathon was originally written by Philo, who promulgated his own cosmogonic-historical opinion that the gods were deified kings or heroes in the venerable name of an ancient Phœnician writer, who probably never existed. The Greek fragments still extant have been published by Orelli (Leipsic, 1826), and in Cary's "Ancient Fragments" (London, 1832). In 1837 Friedrich Wagenfeld published at Bremen what purported to be the entire Greek text of Philo's Sanchoniathon, said to have been discovered in a convent in Portugal. Other scholars, however, soon after proved the work to be a fabrication of the editor.

SANCROFT, WILLIAM, an English prelate, born at Fresingfield, Suffolk, Jan. 13, 1616, died there, Nov. 24, 1693. He was educated at Emmanuel college, Cambridge, of which he became a fellow in 1642, but lost his fellowship in the same year by refusing to subscribe to the "Solemn League and Covenant." In 1660 he was chosen one of the university preachers, presented to the rectory of Houghton-le-Spring, and made a prebendary of the cathedral of Durham; and after various other preferments, he became in 1678 archbishop of Canterbury. When James II. issued his declaration for liberty of conscience, and required the clergy to publish it, Sancroft refused, and with 6 other bishops presented a petition to the king against it. The 7 prelates were committed to the tower on a charge of libel, but upon trial were acquitted. Sancroft refused to take the oath of allegiance to William III. and Queen Mary, and being consequently deposed he retired to his birthplace, and passed the rest of his life in seclusion. He published some sermons, and a volume of "Letters to Mr. North" (afterward Sir Henry). A work entitled "Modern Policies and Practices," taken from Machiavelli and others, was published posthumously in 1757.

**SANCTORIUS**, or **SANTORIO**, an Italian physician, born in Capo d'Istria in 1561, died in Venice in 1626. He was for many years professor of medicine at the university of Padua. He devoted much attention to the subject of perspiration, and believed that he had found in the quantity and quality of this evacuation of the body the key to the preservation of health. He is said to have invented the thermometer. His most important work is *Ars de Statica Medicina* (Venice, 1614). A collection of his writings was published at Venice in 1660 (4 vols. 4to.).

**SANCTUARY**. See **ASYLUM**.

**SAND**, small grains of stone derived from the disintegration of rocks. Unless rocks are of silicious character, their disintegrated grains pass into mud, and sands are consequently almost universally quartzose. If largely mixed with clayey and calcareous particles, the composition is known as marl, and a coarse mixture of sand and pebbles is called gravel. Along the banks of rivers and the coasts of lakes and seas the sands are met with in large bodies, washed clean of the muddy particles which may have been associated with them, and which the currents have swept away. They are thrown up by the waves in beaches and carried inland by the winds, where the collections grow into hills and overspread the face of the country, and, having none of the elements of fertility, form barren dunes and deserts. (See **DUNES**.) In ancient geological periods the same causes that now produce the wide-spread layers of sand were in continual operation, the result of which is seen in the vast beds of silicious particles occurring in all the formations, but consolidated into solid rock. (See **SANDSTONE**.) Modern sands are also thus occasionally found consolidated over limited areas, especially where springs flow among them carrying calcareous or ferruginous matters in solution, which act as a cement binding the particles together. The sands at the bottom of the sea are often found to be thus consolidated into stone where lost anchors, iron cannon, and balls have lain for a few years among them, the oxide of iron produced by the rusting acting as the cement; the rock thus formed retains the remnants of the articles in its mass as fossils. Sands are often the repositories of the valuable metals and precious stones that were originally contained in the rocks from which they were all derived.—In the arts sand is applied to a great variety of useful purposes, for an account of some of which reference may be made to the descriptions of the several articles of which it forms an important part, as **BRICK**, **GLASS**, **MORTAR**, **POTTERY**, &c. Its use as a filtering agent is noticed in the article **FILTER**; for moulding purposes in **FOUNDRY** and **IRON MANUFACTURING**; and for cutting softer stones by the sawing process in **MARBLE**. It is used like emery and glass to coat paper for wearing down and smoothing articles of wood and other substances; and in other ways also

it is a useful scrubbing and cleansing material, both in the arts and for domestic purposes. In mining operations (see **BLASTING**) it is found to possess the valuable property of packing closely in cracks and crevices, and though thrown in loosely over the powder it acts against the force of the explosion as well as the hardest tamping. This property is illustrated in the simple experiment of filling a tube with sand, one end being stopped with a cover merely strong enough to retain the contents. If a solid piston be then introduced into the other end upon the sand, no force can be applied that will push it through. If a small hole be made through the retaining diaphragm in the lower end, the sand will flow out at a uniform rate without respect to the height of the column above; hence its peculiar adaptation as a measurer of time in hour glasses. It is the same property of not transmitting pressure applied to it that renders sand the best protective defence against cannon balls. The most convenient method of using it for this purpose is in bags piled up.

**SAND**, **GEORGE**. See **DUDEVANT**.

**SAND**, **KARL LUDWIG**, a German student of theology, the murderer of Kotzebue, born at Wunsiedel, Upper Franconia, Oct. 5, 1795, executed near Mannheim, May 20, 1820. After studying at the universities of Tübingen and Erlangen, he entered that of Jena in 1817, and became a member of the *Burschenschaft*. He volunteered in 1815 to serve against the French, but his corps was not called into action; and he carried to a fanatical extent the enthusiasm for liberty and German nationality then prevalent among German students. Among the writers who opposed these sentiments, Kotzebue made himself especially obnoxious by his unsparing ridicule; and when it was discovered that he was in the pay of Russia, the exasperation against him became intense. Sand, looking upon him as a moral outlaw whom there was no legal means of reaching, conceived it to be a religious duty to destroy him. It was some months before he could decide to act, for he was of a mild and affectionate nature, and strictly pure and moral in his life. Having delivered a letter to Kotzebue at his residence in Mannheim, March 23, 1819, while he was reading it Sand struck him thrice with a dagger, then went into the street, and kneeling down, cried aloud: "Long live my German fatherland," and stabbed himself, but not mortally. This attempt at suicide was the only part of the affair for which he ever expressed regret. The murder created much alarm among the German governments, and many of the new gymnasia, in which the revolutionary spirit was strongest, were closed; but the most rigorous inquiry failed to implicate anybody in the murder but Sand himself.

**SAND CRAB**. See **CRAB**.

**SAND EEL**. See **EEL**.

**SAND GROUSE**. See **GROUSE**.

**SAND LAUNCE**. See **EEL**.

**SAND MARTIN**. See **SWALLOW**.

**SAND WASP**, the common name of a family of fossorial hymenopterous insects, the *sphægidæ* of Latreille. They have a long abdomen attached to the thorax by a long thin pedicle, filiform antennæ, and feet adapted for digging. There are numerous species, generally of large size, of a violet blue color, sometimes banded with yellow; the females are provided with a sting; there are no neuters, the female making her own nest in the sand, taking care of and securing provision for the larvæ; they are very industrious. After laying an egg in a cell the mother places in it living insects, stinging them so as to produce stupefaction without death, and then closes the cell; the larva when hatched feeds upon the imprisoned insects, and grows rapidly; it then spins a silky cocoon in which it undergoes transformation. The genus *pompilus* (Fab.) provisions its nest with spiders; the genus *sphæx* (Latr.), whose species are scattered all over the world, especially in warm climates, makes use also of large orthopterous insects; *ammophilus sabulosus* (Kirby), common in Europe, selects the larvæ of moths; *chlorion compressum* (Latr.), of Mauritius, of a shining bluish green color, feeds its young on cockroaches, and is therefore much esteemed by the natives. Some wasps of the family *crabronidæ* also make their nests in sand and earth, feeding their young on insects.

**SANDAL WOOD**, the fragrant heart wood of the *santalum album*, a small evergreen tree somewhat like a large myrtle, of the natural order *santalaceæ*, growing in Hindostan and Ceylon. In the South sea islands a similar wood is found in the tree *S. Freycinetianum*. Sandal wood is carried to Calcutta from the Ghauts and the coast of Malabar to the amount of about 200 tons annually, and is largely employed by the Hindoos in their funeral ceremonies as a perfume. They also use it in the preparation of a sedative cooling medicine. The Chinese obtain it from Timor and the Feejee islands; they employ it in cabinet work for the manufacture of fans and ornamental articles, and grind it to powder for a cosmetic. The manufactured articles are brought to the United States as curiosities, and the logs are sometimes imported into Europe. Before removing the logs from the forests they are buried in the earth for about two months, in order that the white ants may remove the outer wood, which they do effectually, leaving the heart wood untouched. This is from 8 to 10 or 12 inches in diameter. The wood is close-grained, somewhat softer than boxwood, for which it is the best substitute in wood engraving known in India. The best for this purpose is dark-colored and of small size, about 5 inches in diameter, the product of a dry rocky soil. It is an elastic wood, hardens on exposure to the air, and is occasionally quite equal to boxwood, some blocks having yielded more than 20,000 impressions without being worn out.

**SANDARACH**, a resinous substance obtained from the *thuya articulata*, a small conif-

ferous tree growing in the N. of Africa. Brongniart and Schousboe call the tree the *callitris quadrivalvis*, and Thomson refers the product to the common juniper tree. In Barbary the tree is known as the *arar*, and is sawed into boards, which are regarded by the Turks as indestructible, and are used for the ceilings and floors of their mosques. The resin is collected in elongated or spherical drops or tears, of a pale yellow color, transparent and brittle. It melts at a gentle heat, diffusing a balsamic odor. It is entirely soluble in anhydrous alcohol and in ether, but is divisible into three different resins by successive solutions in alcohol of different strengths, or in oil of turpentine, ether, and alcohol. The use of sandarach is chiefly for making a soft, pale varnish for light-colored woods. It has been employed in medicine, and is still used in the preparation of various ointments and plasters, also in incense.

**SANDEAU**, JULES, a French novelist, born in Aubusson in 1810. He was educated at the college of Bourges, and afterward went to Paris to study law, which he abandoned for literature in 1831, becoming one of the contributors to *Figaro*. He was then on intimate terms with Mme. Dudevant, and assisted her largely in her first novel, *Rose et Blanche*, which appeared under the name of Jules Sand. The association was broken off on the publication of Mme. Dudevant's *Indiana* (1832), and M. Sandeau soon acquired considerable popularity. Among his novels are: *Madame de Sommerville* (1834), *Mariana* (1839), *Le docteur Herbaut* (1841), *Richard* (1848), *Vaillance* and *Fernand* (1844), *Catherine* (1845), *Madeleine* (1846), *Valcreuse* and *Un héritage* (1847), *Mademoiselle de La Seiglière* (1848), *La chasse au roman* (1849), *Sacs et parchemins* (1851), *Le château de Montsabrey* (1853), *Olivier* (1854), &c. In 1851 he successfully adapted to the stage his novel *Mademoiselle de la Seiglière*; and he has since written for the theatre, in conjunction with Émile Augier, *Le gendre de M. Poirier*, *La pierre de touche*, and *La ceinture dorée*. He held for some years a subordinate office in the imperial library, and in 1854 was appointed keeper in the Mazarine library. In 1857 he was elected a member of the French academy.

**SANDEMANIANS**, a sect of Christians who originally separated from the Presbyterian church of Scotland. Their actual founder was the Rev. John Glass, a native of Dundee (1695-1773); and his numerous tracts and expositions, the most important of which is entitled the "Testimony of the King of Martyrs," form, next to the Scriptures, the sacred writings of the sect. For a considerable time they were known by the name of Glassites, but about the middle of the 18th century they assumed the name of Sandemanians, from the Rev. Robert Sandeman, the son-in-law of the Rev. Mr. Glass, and an eminent elder in their communion, who had reduced the opinions of Mr. Glass to a clear and consistent system. San-



deman was born in Perth in 1723, and after officiating as a minister in Scotland for about 20 years, joined in 1764 a party of emigrants to America, and settled in Danbury, Conn., where he died in 1771. Under his influence churches were gathered in the principal cities of Scotland, in Newcastle, London, and other English cities, and in several towns of Connecticut and Massachusetts. Most of these churches have died out, but a few remain, the most important of which are at Dundee, Edinburgh, and Danbury. The number of persons at present belonging to the sect is probably less than 2,000. The peculiarities of the Sandemanians are their construction of the word "faith," which they interpret as simple assent to the teaching and divinity of Christ; rejection of all mystical or double sense from the Scriptures; prohibition of all games of chance; weekly love feasts, being the dinner of all the church together on every Sunday; the kiss of brotherhood, which passes between all the members, male and female, at their solemn meetings; strict abstinence from all blood and "things strangled," according to the Jewish precept; plurality of elders, two at least being required for all acts of discipline and all administration of ritual; prohibition of college training; and the absence of all prayer at their funerals. Their religious services are confined mostly to the reading and explanation of Scriptures; and where there is no special church, the meetings are held in the houses of the brethren, where indeed all are at home at all times. The custom of washing feet, once practised by the sect, is now discontinued. No previous training is necessary to enable one to become an elder. The opinions of the sect may be studied in the writings of Mr. Glass (4 vols. 8vo., Edinburgh, 1762). Sandeman left no writings of importance.

SANDERLING, a wading bird of the genus *calidris* (Cuv.), differing from the sandpipers (*tringa*, Linn.) chiefly in the absence of the hind toe. The common sanderling is the *C. arenaria* (Ill.), inhabiting the temperate regions of America and Europe; it is from 7½ to 8 inches long, with an alar extent of 12½, the bill 1 inch and the tarsus the same, and the weight 1½ oz. The plumage above is ashy gray with lighter edges, with spots of brownish black on the head and back, and with fine transverse lines on the rump and upper tail coverts; under parts pure white; shoulders brownish black without spots; quills with white shafts; the greater wing coverts widely tipped and the middle tail feathers edged with white; bill and legs greenish black; the bill is straight, a little widened at the end; the tail is doubly emarginated, the middle feathers the longest; both sexes are alike; in the spring the plumage is more or less tinged and edged with yellowish red. It is abundant from the Atlantic to the Pacific, in winter going to the southern states and to South America; the European bird presents no certain distinguishing marks from the American; it arrives in

Maine from the north about Aug. 1, in New Jersey Aug. 10, and on the sand banks of E. Florida in November. It occurs either in small or large flocks, sometimes with other small beach birds; it feeds on marine worms and minute mollusks and crustaceans, in search of which it probes the sand on the edge of the retreating tide. The flight is rapid and direct, generally for 100 yards or more, and when they alight they run a few feet with wings partially extended, and with great rapidity. A flock should be fired at the moment it alights, as the birds immediately after separate in search of food. The flesh affords good eating.

SANDERSON, JOHN, an American author, born in Carlisle, Penn., in 1783, died in Philadelphia, April 5, 1844. He studied law in Philadelphia, but became a teacher and ultimately part proprietor of the Clermont seminary, and a contributor to the "Portfolio" and the "Aurora." In conjunction with his brother J. M. Sanderson, he wrote the "Biography of the Signers of the Declaration of Independence" (12 vols. 8vo., Philadelphia, 1827; revised and edited by Robert T. Conrad, 1 vol. imp. 8vo., 1846); and in defence of the classics he published in 1826 a pamphlet entitled "Remarks on the Plan of a College to exclude the Latin and Greek Languages." His health failing in 1835, he spent nearly a year in Paris, and published a sprightly account of his impressions and observations entitled "Sketches of Paris, in Familiar Letters to his Friends, by an American Gentleman" (8vo., Philadelphia, 1838; enlarged edition, under the title of "The American in Paris," 2 vols. 8vo., 1847). He also visited England, about which he published several articles in the "Knickerbocker Magazine." After his return he was teacher of Greek and Latin in the Philadelphia high school.

SANDOVAL, FRAY PRUDENCIO DE, a Spanish historian, born in Valladolid, or, according to some authorities, in Monterey, Galicia, about 1560, died in Pampeluna, March 17, 1621. He was educated for the church, took monastic orders, and was appointed by Philip III. bishop of Tuy in Galicia, whence in 1612 he was translated to the see of Pampeluna. He was also royal historiographer. His principal works are: *Historia de los reyes de Castilla y de Leon*, *Historia de la vida y hechos del emperador Carlos V.*, &c. He also edited the works of four chroniclers of the 12th century under the title of *Las cronicas de los quatro obispos*.

SANDPIPER, the common name of the *tringinae*, an extensive sub-family of small wading birds of the snipe family. They have the bill as long as or longer than the head, slender, compressed on the sides, with the culmen slightly depressed and enlarged near the tip, and the greater portion covered with a soft, very sensitive skin; the nostrils are basal, in a groove extending for ⅓ of the bill; the wings long and pointed, the tail moderate and nearly even, the tarsi usually long and slender, and the toes but slightly united at the base. In the typical genus

*tringa* (Linn.) the first primary is longest, the tertiaries long, and the secondaries short; the tarsus is covered in front with transverse scales, the hind toe very small, the anterior toes margined with membrane and free at the base. There are between 20 and 30 species, in all parts of the world, some widely diffused, and a few common to America and Europe; they are usually seen in flocks on the sea shore or on the margins of lakes and rivers, and in marshes, probing the sand and mud with the bill in search of worms and minute crustaceans, and running along the edge of the retreating tide picking up the refuse of the ocean. They are generally migratory, rearing their young in summer in the north, and extending over temperate regions in autumn and winter; the colors of the spring and autumn plumage are different in most species, which has created some confusion in specific descriptions; both sexes are much alike in color, but the females are frequently the largest.—Among the American species may first be mentioned the purple sandpiper (*T. maritima*, Brunn.; *arquatella*, Baird), 8 to 9 inches long, with an alar extent of 14; the head and upper parts are smoky brown with a purplish tinge; under parts from the breast white with longitudinal dark ashy spots; wing coverts and quills edged with white; axillaries and under wing coverts white; bill yellow at base and dark at tip; legs yellow. It is found on the shores of eastern North America, and in winter in tropical North and South America, and also in the temperate parts of Europe. From their frequenting rocky instead of sandy shores, gunners call them rock snipes; the young in autumn and winter are fat and delicious; the eggs are  $1\frac{1}{4}$  by 1 inch, yellowish gray with small pale brown spots at the larger end. The red-backed sandpiper (*T. alpina*, Linn.; *schenckius*, Möhr.) is about 8 $\frac{1}{2}$  inches long; yellowish red above mixed with ashy, each feather with a central dark spot; the front and sides of the head and lower parts ashy white, nearly pure white on the abdomen and under tail coverts; a wide black band across the lower breast, and above this the neck with narrow brownish black streaks; under the wings white; quills ashy brown with white shafts; bill and legs blackish; in winter it is much darker above, without reddish tints, white below with the breast pale ashy. It is very abundant on the Atlantic shores, in sandy and muddy places; it is found also in temperate Europe, where it is called dunlin and purr; Mr. Cassin thinks the American bird a distinct species, and gives it the name of *Americana*, it being larger with a proportionately longer bill. It is very active while feeding; the flesh is excellent; the nest is a slight hollow in a dry place lined with grass; the young leave the nest as soon as hatched, as do all the species. The pectoral sandpiper (*T. maculata*, Vieill.; *actodromas*, Kaup) is about 9 inches long; brownish black above with edgings of ashy and brownish red; the rump and upper tail coverts black; ashy

white line from the bill over the eye; lower parts white, ashy on the breast, with partly hidden brownish black pointed spots; secondaries edged with white and tertiaries with reddish yellow; basal part of bill light yellow. It is distributed throughout the coasts of North America, going in winter far into South America; it also occurs in Europe; as it is fond of damp places, and is often seen solitary, it is called jack snipe by some sportsmen; it eats insects and sea weeds as well as marine animals. The least sandpiper, or peep (*T. Wilsonii*, Nutt.), is the smallest of the group in this country, being only 5 $\frac{1}{4}$  to 6 inches long; the feathers on the upper parts are brownish black in the centre, with a wide margin of ashy and brownish red; rump and middle of upper tail coverts black; eye stripe, throat, and breast pale ashy white, with spots of ashy brown, and the rest of the under parts white. It is abundant over the entire temperate regions of North America; it breeds in the far north, arriving in Massachusetts early in July, in flocks sometimes with the next species; it is then very fat and delicious eating; its congener in Europe is the *T. minuta* (Leisler). The semi-palmated sandpiper (*T. semipalmata*, Wils.; *creunetes*, Ill.) is about 6 $\frac{1}{4}$  inches long, with thicker bill than is usual in the group; it is light brownish ashy above, with brownish black spots, and much resembles the peep, but the toes are united at the base by a web and the size is larger. It is found over temperate North and South America, presenting great variation in the length of the bill; its flesh is excellent. The long-legged sandpiper (*T. himantopus*, Bonap.; *micropalama*, Baird) has also a membrane between the toes, but a longer and more curved bill and longer legs; it comes near the snipes in many respects. It is 8 $\frac{1}{2}$  to 9 inches long, brownish black above with ashy white and yellowish red edgings; eye stripe brownish red; rump and upper tail coverts white with spots and stripes of brownish black; ashy white below tinged with pale reddish, with brownish black stripes on the neck and bars on other parts. It is found throughout eastern North America. Like most of the other species, this inclines the body to each side, showing alternately the upper and lower surfaces during flight.—Among the European species of sandpipers the ruff, the knot, and the sanderling have been noticed under these titles. The curlew sandpiper (*T. subarquata*, Temm.; *erolia*, Vieill.) is 8 $\frac{1}{4}$  to 9 inches long; the bill is rather longer than the head and slightly curved at the tip; the legs long and slender; the upper parts are brownish black, the feathers with edgings and spots of bright yellowish red, rump and wings ashy brown; upper tail coverts white with brownish black bands; below dark yellowish rufous; sides, under wing and tail, and shafts of primaries white; in the young there is less of the red above, and the under parts are dull white tinged with yellowish on the breast and sides. It is widely diffused in Europe, Asia, and Africa,

and a straggler has occasionally been shot on the Atlantic coast of America near New York. The solitary, spotted, and buff-breasted sandpipers will be noticed under TARTLER, to which sub-family they properly belong; Bartram's sandpiper, or the upland plover, has been described under PLOVER.

SANDRART, JOACHIM VON, a German painter and author, born in Frankfurt-on-the-Main in 1606, died in Nuremberg in 1688. He was a pupil of Gerhard Honthorst, and after a residence of some years in Italy was employed at Frankfurt by the emperor Ferdinand III. and Maximilian of Bavaria. Retiring to Nuremberg in the latter part of his life, he published the *Academia Artis Pictoria, Romæ Antiquæ et Novæ Theatrum*, and other works, which appeared in a uniform German translation in 1769-'75 (8 vols. fol., Nuremberg).

SANDS, ROBERT CHARLES, an American author, born in Flatbush, on Long island, May 11, 1799, died at Hoboken, N. J., Dec. 17, 1832. He was graduated at Columbia college in 1815, having previously, with his college companion James Wallis Eastburn, published one number of a literary periodical, "The Moralist," and a volume of another, "Academic Recreations." He studied law, and commenced practice in 1820; but after a few years he abandoned the profession and devoted himself exclusively to literature. He aided his friend Eastburn in translating the Psalms into verse, and wrote in conjunction with him the poem of "Yamoyden" (New York, 1820), founded on the history of the Indian King Philip. After the death of Eastburn he composed a "Proem," or poetical introduction to Yamoyden, which was prefixed to it, and at the time attracted particular attention. He early became associated with three other writers in a "literary confederacy," which furnished articles for newspapers and the "Literary Review," and published 7 numbers of a humorous periodical called the "St. Tammany Magazine." In May, 1824, the "Atlantic Magazine" was commenced, which Sands edited for the first 6 months; and after an interval, the name having been changed to the "New York Review," he resumed his connection with it, which continued till 1827, from which time till his death he was one of the editors of the "Commercial Advertiser" daily journal. In 1828 he wrote an extended "Historical Notice of Hernan Cortes," to be prefixed to an edition of Cortes's letters for the South American market; it was translated into Spanish by Manuel Dominguez, but was first published in English in the collection of his works after his death. To the "Talisman," an annual written by himself, Bryant, and Verplanck (3 vols., 1828-'30; afterward republished under the title of "Miscellanies"), he contributed one of his best and longest poems, the "Dream of the Princess Papantzin," founded on a Mexican legend related by Clavigero. In 1831 he published the "Life and Correspondence of Paul Jones;" and he was associ-

ated with Bryant, Paulding, and others in the "Tales of Glauber Spa" (2 vols., 1832). His last poem was "The Dead of 1832," published in the "Commercial Advertiser." He was seized with apoplexy while writing an article for the first number of the "Knickerbocker Magazine," and died in a few hours. The "Writings of Robert O. Sands, in Prose and Verse," were published with a memoir by Gulian C. Verplanck (2 vols. 8vo., New York, 1834).

SANDSTONE, a rock formed of grains of sand, often intermixed with coarse pebbles, cemented together by the infiltration through them at some period of calcareous, argillaceous, ferruginous, or silicious substances. The effect of this, combined with long continued pressure of superincumbent deposits, has been to solidify the collections of sands and convert them into solid strata of rock. These are of common occurrence through all the geological formations from the metamorphic group upward, and the hard quartz rocks of this group are now understood to be altered sandstones. Those formations of the stratified rocks in which layers of sandstone prevail are often specially designated by this name, though numerous alternating beds of slates, shales, and limestone may be found among them. Beds formed of very coarse pebbles are known as puddingstones and conglomerates. (See CONGLOMERATE.) The Potsdam sandstone, near the base of the silurian rocks, is an extremely hard, close-grained, quartzose sandstone, often occurring in broad sheets and little intermixed with other strata. Its beds in several places in New England, New York, and E. Pennsylvania, attain a thickness exceeding 300 feet; and at the town of Potsdam in St. Lawrence co., N. Y., a thickness of full 70 feet is exposed in the quarries. The rock is remarkable for the uniform thickness it retains in broad sheets of almost any area and thickness; thus masses are taken out 30 feet square and 2 feet or more thick, perfectly solid and smooth. Divisional planes are exposed by the hammer and wedges, and the thickness of the sheets may be reduced even to an inch. The general color of the rock is yellowish brown, variously shaded in the different layers. It is easily quarried, but becomes harder on exposure by the evaporation of the aqueous particles diffused through it, and consequent hardening of the silica with which it was in part combined. Stones thus formed of fine quartz sand thoroughly solidified and free from foreign substances make the most durable building stones. They are also good fire stones, and are much used for the hearths of blast furnaces. Many other sandstones from the different geological formations are extensively employed for building purposes, some of which prove very durable and excellent, easily quarried in sheets, of agreeable color, and well suited by their hardness and sharpness of grit for architectural ornaments. Such especially are the grits or harder sandstones of the coal measures, usually of a

brownish yellow or whitish color. The formations known as the old red and new red sandstones afford quarries of superior building stones; but they also contain many layers of very inferior stone, such as crumble away by continued exposure to the atmosphere. Examples of the several varieties are to be seen in the different structures in our own cities. Trinity church in New York and the Athenæum in Boston are examples of well selected red sandstones, or "brown stone," from the quarries near Belleville, N. J. The stone is hard, of sharp grit, the grains firmly united to each other without intermixture of other substances than the little peroxide of iron which cements them together and imparts the red color to the mass. But in the basement of the city hall, New York, the red sandstone, though having the same general appearance, is seen to be rapidly crumbling away. Sometimes blocks of this rock which have lain a few years in walls are seen so disintegrated that they may be penetrated by a knife or sharp point like the original sands. The old portion of the capitol at Washington is built of an inferior variety of sandstone from the Potomac, and is seen to be in a dilapidated condition. In England sandstone is much more used for building purposes than other rocks, the better sorts, as granite, being rarely met with; and in the many structures of different dates the qualities of stone are well exhibited. Edifices of the 12th century, of the hard grits of the coal measures and underlying formations, as Melrose abbey and the cathedral of Glasgow, are in the finest state of preservation; and in some of those of the next century, as Ecclestone abbey near Barnard castle, the original sharp outlines of the delicate mouldings and other decorations are still finely retained; while other edifices, as Durham castle, and even the Hunterian museum in Glasgow, built in 1804, manifest decided symptoms of decay. The cause of these differences may be the imperfect consolidation of the grains, and a texture that admits the absorption of water, which, freezing and thawing within the mass, throws off successive portions from the outside; or it may be the original intermixture of foreign substances that are acted upon by atmospheric influences, as iron pyrites and carbonate of lime. Both of these together are particularly destructive from the sulphuric acid generated in the decomposition of the former attacking the carbonate and removing this from the stone. All sandstones are liable to absorb water. The best of them, after being thoroughly dried for several days and then immersed a few hours in water, will take up from 2 to 5 per cent. of their weight, which will not be increased by continued immersion. The water is more likely to prove destructive if it enter the seams; and it is consequently an important precaution in laying the stones in walls to place the blocks horizontally with the edges of the stones outward. The laminae are thus pre-

vented from flaking off, as would occur if they were presented to the atmosphere. The method of testing their durability against the action of frost is to boil specimens of them in a strong solution of sulphate of soda, and expose these to the air. The process being repeated a few times for several days, the salt absorbed by the stone crystallizes, and by its expansion throws off portions precisely as the frost would do after several years' exposure. This has been regarded as a satisfactory test; but actual exposure to freezing mixtures is more to be depended upon. (See STONE.)—The sandstones employed for architectural purposes in the cities of the United States are obtained chiefly from quarries of the new red sandstone formation in the Connecticut river valley and in New Jersey; they are also imported from Nova Scotia and New Brunswick, and from Caen in France. (See CAEN STONE.) The Nova Scotia and New Brunswick sandstones are chiefly from the red sandstone district in the vicinity of Shepody bay at the head of the bay of Fundy, and are known in the New York market as the Dorchester and Albert stone. The rock is of a yellowish brown color, darker than the Caen stone, of even grain, and much of it very free from foreign substances. The quarries furnish very large blocks, and are situated directly on the shore of the bay, accessible to large vessels.—Some varieties of sandstone, of a cellular structure and very hard, make a good material for millstones. Strata of this character are found in the bituminous coal measures of the West, and are noticed in the articles BURESTONE, and OMO (vol. xii. p. 499). The coarse conglomerates, when purely silicious and containing clear white pebbles, are very durable and refractory stones, answering equally well for rough and strong buildings and the purposes of fire stones for hearths of furnaces, &c. Attempts have been made to use blocks of this kind, such as the coarser varieties of the Shawangunk grit of Ulster co., N. Y., for pavements; but under heavy wear, as in the most frequented streets of the city of New York, they were soon rendered very uneven, and their use had to be abandoned. For flagging stones several varieties of sandstones answer an excellent purpose, as for example the broad slabs of the Potsdam sandstone already referred to. New York city is chiefly supplied with them from Ulster, Greene, and Albany counties, and from the rock formation known as the Hamilton group. The principal shipping points are Kingston, Saugerties, Coxsackie, Bristol, and New Baltimore on the Hudson river, and the quantities sent down annually amount to several million square feet. The stone is obtained in immense sheets of any desired thickness from nearly horizontal strata, and is divided by perpendicular joints, which are as smooth as if cut by a saw, separating the rock into regular blocks and greatly facilitating the labor of the quarrymen.

**SANDUSKY**, a N. co. of Ohio, bordered N. E. by Sandusky bay, Lake Erie, intersected by Sandusky river, and also drained by Portage river and several smaller streams; area, about 400 sq. m.; pop. in 1850, 14,305; in 1860, 21,147. It has a low and level surface and fertile soil. In the W. part is the Black swamp, covered with forests, which as it is reclaimed is highly productive. The productions in 1850 were 312,689 bushels of Indian corn, 160,393 of wheat, 97,251 of oats, 62,037 of potatoes, and 67,061 lbs. of wool. There were 5 grist mills, 13 saw mills, 3 woollen factories, 5 tanneries, 3 newspaper offices, 6 churches, and 3,531 pupils attending public schools. It is intersected by the Sandusky, Dayton, and Cincinnati, and the Cleveland and Toledo railroads, at the junction of which latter with the Fremont and Indiana railroad is the capital, Fremont.

**SANDUSKY**, a city, port of entry, and the capital of Erie co., Ohio, finely situated on the S. shore of Sandusky bay, 3 m. from Lake Erie, 110 m. N. from Columbus, and 210 m. N. N. E. from Cincinnati; pop. in 1860, 8,408. It has an excellent harbor, the bay being about 20 m. long by about 5 m. wide, with an average depth of 12 feet, easy of access, and secure in all weather. The enrolled and licensed tonnage in 1860 was 15,625 tons; number of clearances 1,407, tonnage 335,316; entrances 1,389, tonnage 224,332. The city is built on an inexhaustible bed of excellent limestone, extensively employed in the construction of churches, public edifices, and dwellings. It contains 12 churches, 3 banks, and 3 newspaper offices. It is on the line of the Cleveland and Toledo railroad, and is the terminus of the Sandusky, Dayton, and Cincinnati, and the Sandusky, Mansfield, and Newark railroads. It is celebrated for its manufacture of articles in hard woods, of which axe and other handles, spokes and hubs of wheels, "bent work" for carriages, &c., are the most important. It is extensively engaged in exporting fresh and salted fish, pine and hardwood timber, shingles, and laths, and is the centre of one of the most promising vine-growing districts in the United States. The city and vicinity attract many visitors in summer by their fine scenery and excellent shooting and fishing.

**SANDWICH ISLANDS**, or **HAWAIIAN GROUP**, 13 islands in the North Pacific, between lat. 18° 55' and 22° 20' N. and long. 154° 55' and 160° 15' W., lying in a curve, and the remotest points being about 350 m. apart; area, nearly 6,200 sq. m.; pop. in 1823, 140,000; in 1832, 130,315; in 1836, 108,579; in 1850, 84,165; in 1853, 73,230. Only 7 of the islands are inhabited, the others being small, rocky, and barren. Hawaii or Owhyhee, the largest and easternmost of the group, is about 4,000 sq. m. in extent, and in 1853 had 24,452 inhabitants. It is very mountainous and volcanic. On the W. coast, the beach is narrow and dry, and overhung by a steep, bleak, barren mountain, which affords water and wood only

in its upper portion. On the other coasts, the elevated plateau which occupies the whole central portion of the island slopes more gently to the sea, and its valleys are rich and fertile. From the central plain rise 3 volcanic peaks, all active, from one of which, Mauna Loa, there were great eruptions in 1852 and 1859. (See **MAUNA LOA**.) Maui, the second island, about  $\frac{1}{4}$  the size of Hawaii, is equally mountainous, and consists of two peninsulas connected by a low isthmus. The western peninsula has hills of only moderate height, but the eastern rises to the altitude of 10,200 feet. Kauai and Oahu, the 3d and 4th islands in size, are also elevated, the plateaus in the centre reaching a height of from 3,800 to 4,800 feet. The S. part of Oahu is however a large and fertile plain, and is the best cultivated and most populous district in the whole group. Molokai, the 5th in size, is broken in surface, and gives evidence of volcanic origin. Lanai and Nihau are less elevated.—The Sandwich islands have some very fine harbors. Honolulu, on the island of Oahu, is protected by a barrier of coral reef, has 21 $\frac{1}{2}$  feet of water on the bar at low tide, and from 4 to 6 $\frac{1}{2}$  fathoms inside. It affords safe anchorage and great facilities for vessels to discharge cargo, and the reefs along the channel might be converted into wharf fronts. It is easy of access from all quarters, and with all winds. Lahaina or Maui is an open roadstead, but with good anchorage. Hilo or Waiakea, on the E. side of Hawaii, is a good natural harbor, protected seaward by a reef of coral and lava, and with from 3 to 8 fathoms of water. Kawaihai and Kialakiakua, on the W. side of Hawaii, and Waimea, Koloa, Nawiliwili, and Hanalei, on Kauai, have also tolerable harbors.—The soil of the Sandwich islands in the uplands is better adapted to grazing than to tillage. In the valleys and plains it is generally very fertile, and yields abundantly, notwithstanding occasional droughts. Owing to the frequency and violence of volcanic eruptions, much of the surface of the islands is insusceptible of culture. The climate is very equable and regarded as healthful. The decrease in the native population is owing partly to emigration on whale and other ships, and partly to the ravages of syphilis, small pox, and other epidemic diseases, which seem specially fatal to the islanders. The mean temperature of the year is 75° F., and the range from 60° to 88°. The productions are wheat, raised mostly on the uplands, and coffee, sugar, cotton, tobacco, cacao, arrow-root, mulberries, yams, sweet potatoes, and taro or breadfruit, in the valleys. Cattle and hogs are raised in considerable quantities, both for home consumption and export.—The inhabitants are usually classed as belonging to the Malay race. They are of a light yellow complexion, possessing good forms and a very considerable degree of bodily strength. They are of a facile, yielding, imitative disposition, and when under good influences capable of considerable intellectual and moral elevation. Under

the instruction of the missionaries they have attained within the past 60 years a higher degree of civilization and intelligence than any other of the Pacific tribes. They have established a general system of education, have numerous and excellent schools, and many churches, in which a large proportion of the inhabitants are communicants. There is however a tendency to subside into the habits and practices of barbarism, and to relapse into the licentiousness which has ever been one of their strongest characteristics. Originally they were not an industrious race, the burden of the preparation of food and clothing, which required but a moderate amount of labor, being imposed upon the women, as in most savage tribes, while the men indulged in the more congenial pursuits of war or idolatrous worship. With increasing intelligence, however, has come a desire for a style of living approaching more nearly to that of the inhabitants of Europe and America, and this has necessitated industry, while moral influences have also encouraged it. The people now cultivate the soil with considerable skill, and manufacture the simple articles which form a part of their exports, such as sugar, molasses, salt, and arrowroot, and have become skilful in the working of iron and other metals.—The agricultural production of the islands is very considerable for a people who 50 years ago knew only the rudest implements, whose instruction on the subject up to the present time has been mainly oral and incidental, and who have not more than 500,000 acres of arable land on all the islands, and much of this yet uncultivated and subject to drought. In 1858 the exports of domestic produce, almost exclusively agricultural, amounted to \$529,966, more than double those of 1852, but not quite equal to those of 1850, which seems to have been an exceptional year. The commerce of the islands is large and steadily increasing. In 1858 the total imports were \$1,089,661, and the exports \$787,082. The custom house receipts were \$116,138, a smaller sum than in any previous year but one since 1849, owing to a considerable reduction of the imports, though the exports were greater than in any previous year. The same year 10 national vessels, 115 merchant vessels, and 526 whalers entered the island ports, and 222,464 galls. sperm oil, 2,551,382 galls. whale oil, and 1,614,710 lbs. whale bone were transshipped. The central location of the islands, both as respects the trade from California to China and Japan, and the great whaling grounds of the N. W. coast, the bay of Islands, and the sperm whale fisheries of the tropics, has made them the most convenient point for the transshipment of oil and bone, and for furnishing supplies to vessels.—The government of the Sandwich islands is a limited monarchy, the king governing the country under the constitution of 1852. The present king is Kamehameha IV. (Alexander Liholiho, born Feb. 9, 1834), who succeeded his father Kamehameha III., Dec.

15, 1854. Each of the larger islands has a governor, who, with the king and queen, the cabinet ministers, the chancellor of the kingdom, the assistant judges of the supreme court, and 8 other members, constitute the privy council. There is also a legislature elected by the people, which sits biennially. The receipts of the public treasury for the two years ending March 31, 1860, were \$656,216, and the expenditures \$643,088. The national debt at the same time was \$108,777. There is no permanent army; the king has a guard of 80 men. The cost of public instruction for the two years above mentioned was \$23,742. There are somewhat more than 400 schools on the islands, and one college.—The Sandwich islands were discovered by Capt. Cook in 1778, and in one of the harbors of Hawaii that navigator was murdered the next year by the natives. At that time each island had its own independent ruler; but Kamehameha I. (1784–1819) reduced them all to his sway. On his death his son, Kamehameha II., abolished idolatry. In April of the next year (1820) the first missionaries from America arrived there. At that time there was no written language, and of course no education; the land was owned by the king and his chiefs, and the people were slaves. “The nation was composed,” says Dr. Anderson, “of thieves, drunkards, and debauchees. Constitutions, laws, courts of justice there were none, and no conception of such things in the native mind. Property, life, every thing was in the hands of irresponsible chiefs.” Kamehameha II. was in general friendly to the missionaries, and under their instructions many of the chiefs and their followers became Christians. Order and the proprieties of civilization were introduced, and in spite of occasional relapses, under the irruption of large bodies of vicious sailors, or the interference of foreign powers, they made commendable progress. Kamehameha II. visited England and died there in 1824. He was succeeded by his brother, Kamehameha III., who was the fast friend of the missionaries, and throughout most of his reign had some of those who had been connected with the mission as his principal counsellors. The language was first reduced to writing in 1822; schools were extensively established over the islands, and now more than  $\frac{1}{4}$  of the population can read, and nearly all the children and youth are in attendance upon the schools. The European dress was substituted for the native. Courts were established; court houses, prisons, roads, and bridges built; a code of justice enacted; and in 1840 the king gave to his people a written constitution, recognizing the principles of Christianity as the foundation of the government. Simultaneously with the promulgation of this constitution the Sandwich islands were declared an independent kingdom; and in 1844 their independence was recognized by Great Britain and the United States. In 1852 the constitution was revised and made somewhat more liberal by the king. Nearly 300 works,

embracing a very considerable range of science, literature, and religious instruction, have been published in the Hawaiian language. The present king, Kamehameha IV., came to the throne in 1854, and carries out with vigor the plans of his father. A large proportion of his cabinet and government officers are Americans formerly connected with the missions. (See KAMEHAMEHA.)

**SANDYS, GEORGE**, an English poet and traveller, son of Dr. Edwin Sandys, archbishop of York, born at Bishopsthorpe in 1577, died at Boxley Abbey, Kent, in March, 1644. He was educated at Oxford, and in 1610 set out on a journey to the East, and wrote "A Relation of a Journey begun in 1610, in Four Books, containing a Description of the Turkish Empire, of Egypt, of the Holy Land, and of the Remote Parts of Italy and Islands adjoining" (1615; 7th ed., 1673). He afterward went to America, where he is supposed to have succeeded his brother Sir Edwin Sandys as treasurer of Virginia, and there completed his translation of Ovid's *Metamorphoses*. He was the author of poetical versions of the Psalms (1636), of the book of Job, Ecclesiastes, Lamentations, &c. (1639), and of the Song of Solomon (1642). His life, by the Rev. H. J. Todd, is prefixed to "Selections from Sandys's Metrical Paraphrases" (London, 1839).

**SANFORD, NATHAN**, an American statesman and jurist, born at Bridgehampton, Long island, N. Y., Nov. 5, 1779, died in Flushing, L. I., Oct. 17, 1883. He was admitted to the bar in Jan. 1779, and was appointed by President Jefferson in 1802 a commissioner in bankruptcy for the district of New York, and in 1803 U. S. district attorney for the same district, an office which he continued to hold during the period of the embargo and the war with Great Britain, until 1816. In 1811 he was elected a member of the assembly of the state of New York, and chosen speaker of that body. Subsequently he became a member of the state senate, and in 1816 he was elected to the U. S. senate. He was a member of the state convention of 1821 to revise the constitution of New York, and in 1823 was appointed chancellor of that state, as the successor of Chancellor Kent. Resigning that office in consequence of impaired health, he served another term in the U. S. senate (1825-'31), and passed the remainder of his life at his country seat at Flushing.

**SANFORD, THADDEUS**, an American journalist, born in Connecticut near the close of the 18th century. In early life he went to New York, where he remained, engaged in mercantile pursuits, until 1822, when he removed to Mobile, Ala., and in 1828 became the editor and proprietor of the "Mobile Register." From 1833 to 1844 he was also president of the bank of Mobile. In 1853 he was appointed by President Pierce collector of Mobile, which position he still (1861) holds under the government of the seceding states; and in 1854 he withdrew from journalism.

**SANGAMON**, a central co. of Ill., intersected by the Sangamon river; area, 986 sq. m.; pop. in 1860, 32,255. Bituminous coal is found in abundance. The surface is mostly level prairie land, diversified with forests of good timber. The productions in 1850 were 3,318,304 bushels of Indian corn, 335,008 of oats, 104,126 of wheat, 120,868 lbs. of wool, and 377,272 of butter. It had 27 churches, 7 newspaper offices, and 3,220 pupils attending public schools. Several important railroads traverse the county. Capital, Springfield.

**SANGUINARIA**, in pharmacy, the root of the *sanguinaria Canadensis*, commonly known as the blood-root or red-root. This is an herbaceous perennial plant of the poppy family, growing abundantly throughout the United States in rich soils and shady situations, and flowering in March and April. The rootstock or rhizome extends horizontally beneath the surface a few inches in length, and of the size of the finger. It sends forth side shoots, from the ends of which, as well as from that of the main root, rise the scape and leaf stalks, surrounded by the sheaths of the bud, all of which spring up together. The leaf is heart-shaped, but deeply lobed, yellowish green on the upper surface, paler on the under, and strongly marked by orange-colored veins. The scape is round and straight, from a few inches to a foot in height, and terminated by a single flower of about 8 petals, which are white, but sometimes tinged with rose or purple. All parts of the plant are pervaded by an orange-colored sap, of deepest color in the root. They all possess the same medicinal qualities, but the root only is made use of. This is dried and pulverized, and is administered while fresh, either in the powder, or in pills prepared from it for the purpose of avoiding the irritating effect of the powder upon the throat, and also in infusion or decoction and tincture. Its properties are those of an acrid narcotic and emetic, in overdose producing violent thirst, faintness, and dimness of vision. In some cases its effects have been fatal. Upon fungous surfaces it acts as an escharotic. It has been found useful in numerous diseases, among which are typhoid pneumonia, catarrh, scarlatina, rheumatism, jaundice, dyspepsia, &c. Many physicians have long relied upon it wholly for the cure of croup. Its active properties appear to reside in a peculiar alkaline principle called sanguinarine, which is separated in the form of a white pearly substance. This has an acrid taste, and forms with the acids salts, all of which, when dissolved in water, produce beautiful red colors.

**SANHEDRIM**, or **SANHEDRIN** (Gr. συνέδριον, assembly, from συν, together, and ἔδρα, seat; Heb. *beth din haggadol*, high court or tribunal), the name of the highest judicial and legislative assembly of the Jewish state during the last periods of its existence. Though the origin of the sanhedrim cannot well be ascertained, it is certain that it received its full development during the rule of the earlier Maccabees. It



also survived, though in a modified shape, the fall of Jerusalem and the total annihilation of Jewish independence by the Romans. It consisted of 70 members, elected from among the elders of the communities and the principal scholars or teachers, and a president or patriarch (*nasi*). Another presiding elder, called "father of the court" (*ab beth din*), was, according to the opinion of the most competent critics, one of the 70. They assembled daily with the exception of the sabbath and holidays, generally at the "hewn-stone chamber" in the interior court of the temple. According to the Talmud, the sanhedrim was vested with the most essential privileges of a supreme legislative as well as judicial body; but there can be no doubt that its functions were frequently limited to a narrow sphere by the sway of the national princes and Roman procurators. Herod the Great almost annihilated the legal sanhedrim, and subsequently several irregular assemblies were convened under that name, which mostly served as tools, being compelled to sanction deeds of tyranny. After the destruction of Jerusalem, the sanhedrim found a temporary refuge in various towns of Judæa. The most renowned presidents belonged to the house of Hillel. (See HEBREWS.)—In 1807 a sanhedrim of 71 was convened at Paris by the emperor Napoleon for the regulation of Jewish affairs in France.

SANILAC, an E. co. of Mich., bordering on Lake Huron, and drained by the head streams of Black and Cass rivers; area, about 1,000 sq. m.; pop. in 1850, 2,112; in 1860, 7,601. It has an undulating and well timbered surface, and a moderately fertile soil. The productions in 1850 were 7,627 bushels of wheat, 6,869 of Indian corn, 7,836 of oats, and 1,214 of hay. Capital, Lexington.

SANNAZARO, GIACOPO, an Italian poet, born in Naples, July 28, 1458, died there, April 25, 1530. He lived much of his life in France, and was a favorite with King Frederic II., whom he accompanied in his exile to that country. His principal work is the *Arcadia*, a pastoral, in alternate prose and verse. A Latin poem, *De Partu Virginis*, acquired for him the designation of the Christian Virgil.

SANSKRIT, the literary language of the Hindoos, the Aryan inhabitants of India. Originally a vernacular dialect in Hindostan, it has for nearly or quite 2,000 years past been kept artificially in use, like the Latin in Europe, by the labors of grammarians and lexicographers, and the transmitted usages of an educated caste, to serve as the means of learned intercourse and composition. Its name (*sanskṛta*, completed, perfected) denotes it as "the cultivated, elaborated, or perfected form of speech," in distinction from the uncultivated dialects, called Pracrit (*prākṛta*, left in the natural condition), which sprang from or were contemporaneous with it. It was brought into India from the N. W. by tribes belonging to the Aryan branch of the Indo-European family, and hav-

ing for their next of kin the Iranians, who spoke dialects which were the ancestors of the modern Persian languages. They entered India as a people of superior qualities, bodily and mental; they dispossessed and drove out or reduced to servitude the aboriginal owners of the soil throughout the region stretching from the Indus to the mouth of the Ganges, originated by degrees the Brahmanic form of polity, spread their influence and institutions over all parts of the peninsula, not excepting those still occupied by the ancient races and languages, and made their sacred dialect the chief vehicle during all future time of the religious, scientific, and literary activity of India. The importance and interest of the Sanskrit has a twofold character; considered in its relation to Indian history, it contains an immense literature, laying open from a very remote epoch nearly to the present day the inward and outward life of a numerous and highly endowed branch of the human family (India still contains a 7th part of our race); as touching the Indo-European languages, it is the most ancient and original among them, and, by reason of its better conservation of the features of their common parent, it throws vastly more light than any other upon the history and relations of all. The latter is the more widely appreciated side of its usefulness, and the one which has most contributed to give currency to its study. Its cultivation by Europeans dates only 75 years back, to the establishment of English supremacy in India, nor did it gain a foothold on European ground till after the beginning of the present century. The earliest translations of Sanskrit works were of the *Bhagavat-Gita* in 1785, the *Hitopadesa* in 1787, and the *Sakuntala* in 1789. Sir William Jones, and later Colebrooke and Wilson, were the Englishmen who did most in India to foster and advance the study; the Schlegels in Germany and Chézy in France were the first who introduced it upon the continent. Bopp (from 1830 onward) founded upon it the new science of the comparative grammar of the Indo-European languages, of which others before him had given but hints or fragments. Within 20 years, the introduction of the Vedas to the knowledge of the world has made a new era in Sanskrit study. Hundreds of Sanskrit texts have been published in the East and in the West; translations from them, with grammars, glossaries, and other apparatus for the learner, are to be found in every cultivated language of Europe; all the considerable universities count instructors in Sanskrit in their faculties, and its students, either for the literature or for the value of the language as an aid to linguistic study, are everywhere numerous.—The Sanskrit is ordinarily written in a character called *dēvanāgarī*, "divine city," which, in its present fully developed form, is of a date several centuries later than the Christian era. The ancient alphabet from which it is descended derives itself, according to the best opinion, from a Semitic source. Respecting the origin

of writing there are even no traditions in the Hindoo literature, as regards either its period or its place of derivation; and scholars are yet at variance as to whether whole departments of the literature were composed before or after the knowledge of a written character. The earliest dated monuments known are those of the Buddhist monarch Priyadarsi, of the 3d century B. C.; their language is already Pracrit. The *dēvanāgarī* is written from left to right; it is a complete mode of writing, representing every analyzable sound by a separate sign; it is of a syllabic character, each consonant implying a short *a*, if the sign of no other vowel is attached to it; if more consonants than one are to be spoken with one vowel, their signs are united into a single compound character. The Sanscrit possesses the 3 primitive vowels *a*, *i*, *u*, in both short and long forms; also the 4 diphthongs *ai*, *au* (usually written and pronounced *ē*, *ō*), *ai*, *au*. It has the mutes of the 3 usual classes, guttural, dental, and labial, in triple form, as *k*, *g*, *gh*; *t*, *d*, *dh*; *p*, *b*, *bh*; corresponding historically with the surd, sonant, and aspirate mutes of the Greek and other Indo-European tongues. Its usual nasals are *n* and *m*; its guttural nasal, *ṅ*, is even a less independent constituent of an alphabet than is our own, occurring almost solely before a following guttural mute. It has the 4 semi-vowels *y*, *r*, *l*, *v*, the sibilant *s*, and the aspiration *h*. This is the Indo-European germ or nucleus of the Sanscrit alphabet, which, however, has become greatly expanded, as follows. The Sanscrit, like many modern languages, uses its *r* and *l* as vowels also, writing them when so used with separate characters. It has developed a *kh*, *th*, and *ph*, which are peculiar to it, and of comparatively rare occurrence. It has gained a full series of palatal sounds, *ch*, *chh*, *j*, *jh*, *ñ*, with a sibilant *ṣ* (the phonetic equivalent of our *sh*); these are mainly derived from the corruption of original gutturals, *ch* and *ṣ* from *k*, *j* from *g*; *chh* mostly corresponds historically to the *ac*, *sk* of the connected languages; *jh* hardly once occurs in the older Sanscrit; and *ñ* is of no more consequence than our *n* in *inch*, *hinge*. It has further added a complete series of lingual (cerebral, cacuminal) sounds, *ṭ*, *ṭh*, *ḍ*, *ḍh*, *ṇ*, *ṣh*, uttered with the tip of the tongue reverted into the dome of the mouth, to the position in which we pronounce our *r*; *ṇ* and *ṣh* are very frequently of euphonic origin, occasioned especially by the phonetic influence of the *r*; the others are also sometimes euphonic products; but all not seldom occur independently in roots and words, and are then almost certain evidences of an origin not Indo-European. The lingual series is usually regarded as derived from or suggested by the aboriginal dialects of India, in which linguals abound. The system is completed by the addition of a nasal sign, written over the syllable to which it belongs, and indicating a nasal sound adapted in its quality to the following consonant (we write it by *ṁ*), and finally

of a breathing, *ḥ*, into which a final *s* or *r* is liable to be converted. The whole scheme is then as follows:

Character.	Vowels.	Semi-vowels.	Nasals.	Surd mutes.	Sonant mutes.	Sibilants.	Aspiration, &c.
Guttural.	a ā	..	ṅ	k, kh	g, gh	..	h
Palatal.	i ī	y	ñ	ch, chh	j, jh	ṣ	
Lingual.	r ṛ	ṛ	ṛ	ṭ, ṭh	ḍ, ḍh	ṣh	h
Dental.	ī ī	l	m	t, th	d, dh	s	m
Labial.	u ū	v	m	p, pb	b, bh	..	..

The completeness of this system of written signs, and its nice adaptation of sign to sound, are very evident. Not less evident is the richness of the system of sounds, and the harmony and proportion of its development. Both, however, often receive ill-judged and exaggerated encomium. The spoken alphabet has the proper characteristics of an ancient and primitive system, lacking many of the later intermediate vowels, spirants, and the like, and the written alphabet, of course, is correspondingly defective; the English possesses at least 5 vowels (or 9, if long and short be counted as separate) and 6 consonants for which the Sanscrit alphabet has no signs. A peculiar and striking feature of the external form of the Sanscrit is presented by its highly elaborate system of euphonic rules, which have play both in the formation and inflection of words, and also, in a yet more searching and extended manner, in the combination of words into a sentence. The ends sought are chiefly the avoidance of the hiatus and of the concurrence of surd and sonant letters, the assimilation of nearly kindred sounds, and the modification of combinations difficult of utterance; and the physical theory of most of the rules is readily traceable. As an illustration of the euphonic combination of the phrase, we take the words *indras apabharan apām garbhān charatī apu antar*; they form the sentence *indro 'pabharann apām garbhān charatī apu antah*. That there is something artificial and arbitrary in the strict application of the system of euphonic changes to the sentence is in itself highly probable, since we can hardly conceive that any people should, in its ordinary use of language, so sacrifice the independence of individual words to an exaggerated sense of euphony; and the probability becomes a certainty when we observe that in the Vedic poetry, the earliest and least artificial literature of the language, the euphonic rules are, as is shown by the metre, in great part unobserved. The accents are two, the acute and the circumflex, corresponding in value to those of the Greek. Neither of them is limited to any particular part of the word, like those of the Latin and Greek; it may stand, in a word of whatever length, on whatever syllable the rules of derivation or composition may direct. The circumflex but seldom rests on a simple long vowel; it belongs chiefly to a syllable whose vowel is preceded by a semi-vowel convertible into a vowel, as *kvā*, *nadyās*.—As regards the

etymological part of grammar, the distinguishing characteristic of the Sanskrit is—beside the great affluence of forms, and the unlimited facility of forming new derivatives and new compounds—their remarkable preservation of original materials and processes, the great regularity and consequent transparency of its formative methods. In most words there is no difficulty in distinguishing from each other root, affix, and termination, and in recognizing the original form and signification of each. For analyzing words, retracing their history, and referring them to their ultimate roots, the utmost facilities are afforded. This character of the language has determined that of the native science of grammar, on which our own grammatical treatment of it is mainly based. The Hindoo grammar is essentially analytical and etymological, dissecting out roots, affixes, themes, terminations, and laying down the rules which govern their combination into vocables. About 2,000 roots are catalogued by the native authorities, but of these the greater part are of no account, being either slightly varied forms of others, or mere grammatical artificialities. The Indo-European roots, however, are far more numerous and faithfully preserved, in form and in signification, by the Sanskrit than by any other member of the family. It is this remarkable conservation of materials and processes which gives prominent importance to the Sanskrit in Indo-European philology, making its introduction the inauguration of a new era in etymologizing, and so in the science of language, which is based on etymology, or the history of individual words.—The whole system of inflection in Sanskrit is most nearly accordant with that of Greek; it is decidedly richer in declension, but vastly poorer in conjugation. In declension, it distinguishes 3 genders, the masculine and neuter agreeing in theme, and usually in inflection, the feminine loving long terminal vowels and fuller endings. The cases are 8: the nominative, with which in most instances the next case, the vocative, agrees in form; two other cases of relation, the dative expressing for, the genitive of; and 4 cases of position or direction: the accusative, expressing to, direct approach, immediate action; the ablative, expressing from; the locative, in; the instrumental, by the side of, along with, with, by. Each occurs in the 3 numbers, singular, dual, and plural, and the usual terminations are as follows: sing. nom. *s* (neut. *m* or wanting), acc. *m*, inst. *ā*, dat. *ē*, abl. *as* (or *i*), gen. *as* (*asya*), loc. *i*; dual, nom., acc., and voc. *ū* (neut. *ī*), inst., dat., and abl. *bhyām*, gen. and loc. *os*; pl. nom. *as* (neut. *āni*, *i*), acc. *as* (masc. *n*); inst. *bhis*; dat. and abl. *bhyas*; loc. *su*. Adjectives are declined like substantives; as comparative and superlative suffixes they add *tara* and *tama*, or *īyans* and *īghā*. The numerals, closely according with those in the related languages, are: 1, *eka*; 2, *dva*; 3, *tri*; 4, *chatur*; 5, *pancha*; 6, *ṣaṣṭi*; 7, *sapta*; 8, *aṣṭa*; 9, *nava*; 10, *daśa*; 11, *ekadaśa*, &c.;

20, *vinṣati*; 30, *trinṣati*; 40, *chatuṣṛinṣati*; 50, *pañcāṣati*; 60, *ṣaṣṭi*; 70, *saptati*; 80, *aṣṭi*; 90, *navati*; 100, *śata*; 1,000, *śaṣa*. The pronouns, excepting the 1st and 2d personal, distinguish 3 genders. They derive themselves from roots of their own, which play also an important part in the development of forms and form-words. Their many irregularities of declension agree nearly with those of the pronouns in the other Indo-European dialects, nor are their roots peculiar. The verb has 2 voices, an active and a middle or reflexive, which latter, in a part of its forms, serves also as a passive, as in Greek. It distinguishes throughout, like the noun, 3 numbers, with the usual 3 persons in each, and the personal terminations are evidently reducible to forms of pronouns, indicating in each case the subject; they are of 2 classes, corresponding to those of the principal and historical tenses in Greek. They are, in their normal form, as follows: active: princ. sing. *mī*, *sī*, *tī*; dual, *vas*, *thas*, *tas*; pl. *mas*, *thas*, *antis*; hist. sing. *m*, *s*, *t*; du. *va*, *tam*, *tām*; pl. *ma*, *ta*, *an*;—middle: princ. sing. *ī*, *śē*, *tē*; du. *vahē*, *āthē*, *ātē*; pl. *mahē*, *dhwē*, *antē*; hist. sing. *ī*, *thas*, *ta*; du. *vahi*, *ātham*, *ātām*; pl. *mahi*, *dhwam*, *anta*. The present and imperfect tenses exhibit various modifications of the verbal root into a special stem, on which is founded a division of the verbs into 10 conjugational classes; all are analogous with changes which the Greek verbs more irregularly undergo in the same tenses, and with scattered phenomena in the other related languages. The present has an imperative, distinguished by special terminations, and a potential, corresponding to the Greek optative, having for its characteristic the vowel *i*. Of a subjunctive, only fragments remain, in the antiquated dialect of the Vedas. The characteristic of the imperfect is an augment, a prefixed *a*. Of other tenses, we have an augmented aorist, of greatly varied formation, answering to the Greek 1st and 2d aorists; a perfect, reduplicated, and with peculiar terminations; a periphrastic future, of late growth; a future of compounded origin, the same with the Greek in *σω*; an imperfect of this future, or a conditional, of very rare occurrence; and finally a precativ, or optative of compound formation, also not common. Fragments of imperative, optative, and subjunctive forms, belonging to the aorist, perfect, and future tenses, are found in the oldest literature, but they are obsolete in the classical Sanskrit. The present, perfect, and future tenses, active, passive, and middle, have participles. Of verbal nouns there is an accusative case (the Latin supine in *um*), used as an infinitive; also an instrumental case, forming a gerund, or a kind of indeclinable past participle (as *bhūtvā*, having been), which is of excessively frequent employment. The derivative forms of the verb, formed at pleasure from any root, are the passive, having a special form only in the present and imperfect, the causative, desiderative, and intensive or frequentative. The affluence of verbal forms is thus seen to be

great, yet the language is far from making full use of them, and the Sanskrit verb is not to be compared for power of expression with the Greek, or even with the Latin; there is a strong tendency, especially in the later styles of writing, to slight the finite forms, and to construct loose and awkward sentences with the participle and gerund. Prepositions, in our sense, are almost absent, the prepositions of the other Indo-European tongues having here still their original value as adverbs, directing the action of the verb, but not directly governing nouns; as prefixes to verbs they are of constant application, and play a great part in the formation of derivatives. Conjunctions and adverbs are in part derived from pronominal roots, in part from nouns.—Syntax is a branch of the grammar of very inferior interest, and is even left out in many of our Sanskrit grammars. Whatever expressiveness and rhetorical charm the language has lies chiefly in its boundless wealth of epithets, and not at all in the construction of its sentences and periods; indeed, a period in Sanskrit is next to an impossibility; the formation and connection of its clauses is of the baldness and simplicity. The excessive use of cumbersome compounds is also a very general fault in Sanskrit construction, appearing in all styles of composition, but especially the more artificial; to say, for instance, “water-play-delighted-maiden-bathing-fragrant (river-breezes)” for “made fragrant by the bathing of maidens delighted with sporting in the water,” is a virtual abnegation of the privileges of an inflected language, and a partial retrogradation to the stiff inexpressiveness of the Chinese.—The construction of Sanskrit metre is based entirely upon quantity, as in Greek, with total disregard of accent. The most ancient metres are of very simple construction, and almost wholly iambic in movement; much of the later versification is remarkable for its extreme complexity, elaborateness, and artificiality.—LITERATURE. The most ancient literature of India, that of the Vedas, will be treated of under the title VEDA, as not composed in the proper Sanskrit dialect, and as forming a body of works of separate and peculiar interest; and, with the Vedas, the whole mass also of Vedic literature, the oldest religious literature of the country. The proper Sanskrit literature is of vast extent, counting by thousands its works still in existence, while titles and quoted fragments of hosts of others, not known to be preserved in their entirety, are on record. Most of these works are still in manuscript, and the largest collections of MSS. out of India itself are those of the East India office in London, the royal library at Berlin, and the Bodleian at Oxford. The period it covers is a vast one; stretching, if the Vedas be included, from at least 1500 B. C. to our own day. Nearly all of it was composed after the language had ceased to be in the fullest sense a spoken vernacular; hence a tinge of artificiality, growing ever deeper as more modern times are ap-

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proached, rests upon it all. With insignificant exceptions, it is all composed in metre, even works of law, of morality, of science; and, in great part, in the so called *śloka*, a 2-line stanza, each line made up of two 8-syllable feet, the movement being chiefly iambic. Every department of knowledge and branch of inquiry is represented in it, with the single exception of history; and the want of the historical element is perhaps the most striking general characteristic of the literature. The Hindoo mind, in utter opposition to the Egyptian and Chinese, has ever been little regardless of objective truth, careless of facts, disinclined to observe and record, laying no stress on the events of outward life, heedless of their connection and succession; hence the absence of a chronology in the literary as well as the political history of India, and the uncertainty of centuries resting upon the date of almost every work. To estimate the absolute value of this mass of literary productions need not be attempted here. Much of it is of a character which has commanded high and general admiration; but it exhibits the characteristic faults and deficiencies of the oriental mind in no slight degree. The want of history robs it of one great source of worth and interest; much of it is trivial and tedious; and to place even its masterpieces on a par with those of the classical languages would be highly presumptuous. Its interest as a record of the life of a great and highly endowed people, of our own blood, whose influence and institutions have affected all eastern Asia, is not easily to be overestimated. After the Vedas, the majestic epic called the *Mahabharata*, of 100,000 double verses, deserves first mention. It contains a certain historic kernel, the contest of two rival dynasties for the possession of Hindostan; but this is so worked over, altered, overlaid with additions of various date and character, that its true form is quite unrecognizable. It was confessedly made a kind of cyclopædia of such knowledge as was deemed desirable for the second or warrior caste. Precisely what period the growth of the compilation covers it is impossible to say; doubtless it extends in both directions from the Christian era. It is published in full at Calcutta, and many of its episodes, especially the *Bhagavat-Gita* and the story of Nala, have been often edited, and translated into almost every modern European language. The *Ramayana* of Valmiki, in extent and fame only inferior to the *Mahabharata*, has for its subject the extension of Brahmanic influence and culture over the wild southern peninsula of India; a theme, however, which shines somewhat dimly through the allegory under which it is intimated—the expedition (*ayana*) of the hero Rama southward to Ceylon, to recover his wife Sita (furrow), stolen away by the giant Ravana. Of other epic or quasi-epic poems we may mention the *Raghuvansa* (“Race of Raghu”), *Kumarasambhava* (“Birth of the

War God"), and *Nalodaya* ("Rise of Nala"), all by Kalidasa; Magha's "Death of Sisupala;" and Harsha's *Naishadhiya*. In the lighter style of lyric and erotic poetry, which is abundantly represented, and by works of greatly differing merit, are deserving of special notice the *Ritusanhara* ("Seasons") and *Meghaduta* ("Cloud Messenger") of Kalidasa, and the *Gita-Govinda* of Jayadeva, describing the adventures of the god Krishna among the shepherdesses, the companions of his youth; a favorite theme of Hindoo song. The "Centuries" of Bhartrihari, and other like works, are aphorismic in their character, pearls of thought and style, intended for edification and instruction. The same ends are served by the collections of fables, of which the most accepted have found their way all over the world; the *Panchatantra*, through Persian and Arabic translations, has entered almost every western literature, as the fables of Bidpai or Pilpay. A somewhat later collection of the same materials, the *Hitopadesa* ("Salutary Instruction"), is one of the most popular books of the Sanskrit literature. It is a question yet in controversy whether the Hindoos are not the originators of the method of conveying instruction by means of fables. The Sanskrit fable is much longer drawn than the western, and depends for its interest more on discourse, and less on situation and action. The Hindoo tales, in verse and in prose, are of comparatively small consequence in the literature; the most noted collection is the *Kathasaritsagara* ("Ocean of Streams of Narration"); through the medium of Persian versions, they are regarded as forming the groundwork of the Arabic literature of like class, represented to us chiefly by the "Arabian Nights' Entertainments." The drama is a most interesting branch of Hindoo literature; no other ancient people, excepting the Greek, has brought forth independently any thing so admirable in this department. The most celebrated dramas are the *Mrichhakat* ("Toy Cart") of Sudraka, and the different works of Kalidasa, as the *Sakuntala*, the *Urrasi*, and "Malavika and Agnimitra," all of which have been edited and translated. The *Sakuntala* is one of the most perfect flowers of the Indian genius; and its selection by the enlightened taste of Sir William Jones and his translation of it into English (1789), whence it passed at once into every language of Europe, was an important epoch in the early history of Sanskrit study. The subjects of the drama are mainly legendary, their catastrophes always happy. They are written in mixed prose and verse, and likewise in mixed Sanskrit and Pracrit; only the higher male characters speaking the cultivated or learned tongue, while the lower, and all the females, talk the vernacular dialect—as is often the case now in the lighter pieces of the popular German theatre. The machinery of the Hindoo stage is not well understood, but it is believed to have been very simple. The grounds on which Kalidasa has been usu-

ally assigned to the 1st century B. C. are now acknowledged to be entirely futile, and the time of the bloom of dramatic composition is as uncertain as other such matters in Hindoo history; more probably it is at least 2 or 3 centuries after Christ. The Puranas form a separate class of works, being the religious literature of the middle period, later than the Vedic, preceding the modern and comparatively insignificant tantras and shastras. They are numerous, of vast extent and varied contents; cosmogony, mythology, legendary history, superstitious science, philosophy, &c., are mingled with their controversial and sectarian theology. Most or all of them belong to the last 1,000 years. The law books attach themselves to, and are a development of, a part of the Vedic literature, viz.: treatises prescribing the religious observances and rules of life of the orthodox Hindoo; domestic and civil duties, offences and penalties, purification and penance, are their subjects. The oldest and most famous among them is the code ascribed to the mythical sage Manu; it has been often translated, and is a chief source of authentic knowledge respecting the elaborated system of Brahmanic polity.—In treating of the scientific literature, the grammar, for its antiquity, originality, and profundity, is entitled to the first place. Of its general character we have already spoken above. In its inception and method it is entirely peculiar, and it has carried phonetic and etymological analysis further than any but the best modern European science. Here, as more than once in other departments, the early works containing the beginnings of the science are lost; the most ancient extant authority, Panini, is the supreme one; the immense grammatical literature is made up almost solely of commentaries and continuations of his work. Its age is uncertain, but it is usually assigned to the 2d or 3d century B. C. Its form is very peculiar; it carries brevity to the utmost extreme, far beyond the limits of orderly arrangement and intelligibility, availing itself of a technical terminology almost mathematical; the 4,000 concise rules which compose it are often compared to so many algebraic formulas. The same style is characteristic of some other departments of the literature, and especially of the text books of the schools of philosophy. Philosophy is another highly important branch of Indian science, and has its roots in the very earliest literature. The Hindoo mind, far more given to introspection than to study of what lies without itself, and seeking to explain the universe by questioning its own interior consciousness instead of by studying the works of creation, has always been especially active in metaphysical speculation, and has shown an ability and acuteness in the construction of metaphysical systems which have won the highest admiration of those engaged in like pursuits. The object of philosophic inquiry is to escape transmigration, the ever recurring series of births, by the emancipating recog-

nition of absolute truth; and, according to the different ways proposed for attaining this end, there are 6 chief systems: the *Mīmāṃsā* of Jaimini and *Vedānta* of Bādarāyana, founding themselves more directly on the Vedas, and so especially orthodox; the *Nyāya* of Gautama and *Vaiśeṣika* of Kanada, wearing an especially logical character; and the *Sāṃkhya* of Kapila and *Yoga* of Patañjali, atheistic and theistic branches of a school named from the precision affected in the enumeration of its principles. With the *Sāṃkhya* agrees mainly the philosophy of Buddhism, which at the outset was in a manner a popularizing of this system. The Buddhist Sanskrit literature is immense, and has been carried by the spread of the religion to many other countries of Asia, into whose languages it has been translated. The astronomical literature is later by some centuries than the Christian era, and nearly all that there is of true science in the astronomy of the Hindoos was learned by them from the Greeks. They have made in arithmetic and algebra remarkable original progress; and the Hindoo system of decimal notation has made its way, through the Arabs, to the exclusive use of modern enlightened nations, our usual figures being by origin letters of the Sanskrit alphabet. In medicine the acquirements of the Hindoos, as regards the interpretation of the symptoms of disease, and the application of medical and surgical remedies, are not insignificant, and their medical literature, which is as yet little known, is regarded as well deserving study; the most esteemed author whose works are preserved is Susruta. Rhetoric, versification, and music are each represented in a department of the literature. Respecting the arts, whether the fine arts or the practical, little of value is known to exist.—The best Sanskrit grammars are, in English, Wilson's (London, 1847) and Williams's (Oxford, 1857); in French, Oppert's (Berlin, 1859); in German, Bopp's (3d ed., 1861), and, as a manual of reference for the advanced student, Benfey's (Leipzig, 1852). Wilson's lexicon (2 editions, Calcutta, 1819 and 1832), a poor work, but long indispensable to the student, is out of print and very dear; a third edition of it by Goldstücker is begun, but will never be finished. Westergaard's *Radices Linguae Sanscritae* is very valuable, and a necessary accompaniment of Wilson. The great Sanskrit-German lexicon of Böhtlingk and Roth (St. Petersburg), an admirable work, is now (1861) about half done; nearly 10 years will be needed to complete it. Bopp's *Glossarium Sanscritum* (Berlin, 1847) serves the beginner in connection with the texts published by the same author, and contains all the roots and much linguistic information. A good and useful chrestomathy is still a desideratum; of Lassen's (Sanskrit and Latin, Bonn, 1838) a new edition is now in press; Böhtlingk's (St. Petersburg, 1845) lacks a glossary; Benfey's (Leipzig, 1853) is of small service to an unpractised scholar. Texts to be recommended

to the beginner are Bopp's selections from the *Mahabharata*, especially his *Nalus* (Berlin, 1832); the *Hitopadesa* of Schlegel and Lassen (Bonn, 1829), or Johnson (Hertford, 1847); the *Bhagavat-Gita* of Schlegel and Lassen (Bonn, 1846) or Thomson (Hertford, 1855); the *Sakuntala* of Böhtlingk (Bonn, 1846) or Williams (Hertford, 1853); Von Bohlen's *Bhartrihari* (Berlin, 1833), &c.

SANSON, NICOLAS, a French geographer, born in Abbéville, Picardy, Dec. 20, 1600, died in Paris, July 7 or 16, 1667. He early applied himself to geography, producing a map of Gaul at the age of 16, but was afterward engaged for some time in commerce. Not succeeding in this, he returned to his favorite science, was patronized by Richelieu and Louis XIII., who appointed him engineer in Picardy, and, returning to Paris about 1640, was named geographer to the king and councillor of state. He has been called the 'father of French geography,' and his maps are very numerous, and more correct than those of his predecessors Ortelius and Mercator; but he disregarded the astronomical observations of his time, and adhered to the Ptolemaic longitudes, thus committing great errors, which were rectified by De Lisle half a century later. Beside maps, he published works on the geography of ancient Gaul, Greece, the Roman empire, sacred geography, &c. His 3 sons were all geographers, the second, Adrien, continuing the publication of maps till his death in 1718, when he was succeeded by his nephew.

SANTA ANNA, a N. co. of New Mexico, bordering on California, intersected by the Rio Colorado in the W., and drained by the Rio de Lino, Rio Puerco, and on the extreme E. by the Rio Grande del Norte; area, about 20,000 sq. m.; pop. in 1860, 3,572. Its surface is diversified, being crossed by several mountain ranges, the principal of which are the Sierras del Carrizo and de Chusca, and the Jemez mountains. Capital, Jemez.

SANTA ANNA, ANTONIO LOPEZ DE, ex-president and dictator of Mexico, born in Jalapa, Feb. 21, 1798. He first came into public notice in 1821 in the war of independence; and in 1822, having expelled the royalists from Vera Cruz, he was appointed to the command of that city. In November of that year he was deposed by Iturbide, who had proclaimed himself emperor; but Santa Anna refused to submit to his authority, raised the banner of the republic in Vera Cruz, and in 1823 succeeded in compassing his downfall. In the changes which quickly followed he placed himself at the head of the federal party, but was defeated, and retired to his estate at Jalapa. In 1828 he took the field against the government of Pedraza, chosen to the presidency by an electoral majority of two, declaring the election of Guerrero valid; and after a series of engagements retired to Oajaca. The command of the forces against the Spanish expedition under Barradas was intrusted to him; and embarking at Vera

Cruz he forced Barradas to capitulate at Tampico, Sept. 11, 1829. Guerrero made him minister of war and commander-in-chief of the army, but continuing afterward to exercise the dictatorial powers with which he had been invested to repel the invasion, Santa Anna combined with Bustamante to overthrow him, and the latter was made president by the army. In Jan. 1832, however, Santa Anna headed a new insurrection, declaring for his former opponent, Pedraza, whose triumph he insured by a victory over the government troops in October of that year. Being himself chosen president in March, 1833, he had to confront a popular insurrection under Arista and Don Gabriel Duran, but speedily subdued it. He now left the party of the federalists, and put himself at the head of the centralists, who wished the power concentrated in the executive government. Though a favorite with the army, which desired him to be made dictator, he was unpopular with the nation, especially as a rumor was spreading that he aimed at the imperial dignity. A new revolt broke out in 4 provinces, and a manifesto was issued at Texea against his government. On May 11, 1835, he utterly defeated the army of the insurgents on the plains of Guadalupe near Zacatecas, killing 2,000 and taking 2,700 prisoners. This was a fatal blow to the republican party in Mexico, and Santa Anna was named dictator. The destruction of the federal constitution was soon consummated; the state legislatures were abolished, their places being supplied by a departmental council, and the governors of the several states became dependent upon the supreme power. Mexico was submissive, but a revolutionary feeling had been long existing in Texas, which now broke out into open insurrection. Early in 1836 Santa Anna took the field in person. By the middle of February he reached the Rio Grande at the head of 6,000 troops, stormed the Alamo at San Antonio on March 6 after several days' siege, and massacred its defenders, but with great loss to himself, and after the massacre at Goliad, done under his express orders, marched toward Gonzales. At San Jacinto he met the Texan army under Houston, by whom he was totally routed, April 21, and the day following taken prisoner. During his captivity he made a treaty with the Texans, which resulted in nothing, as his functions were suspended by the Mexican government. In 1837 he was set at liberty, and returned to his native country by way of the United States. On reaching Vera Cruz he was coldly received. At the presidential election of that year he received but 2 out of 69 electoral votes. He had retired to his estate, 27 miles from Vera Cruz, when (Nov. 27) the castle of San Juan de Ulloa was bombarded by the French. He hastened to Vera Cruz, where his services were accepted by Gen. Victoria, and took command after the fall of the castle. He repelled an assault upon that city by the French (Dec. 5), forcing them to embark, but received a wound in the leg which

necessitated its amputation. In the contentions between the centralists and federalists which during the following years distracted Mexico, he was one of the leaders of the former; and from Oct. 10, 1841, to June 4, 1844, he was virtual dictator, under the title of provisional president, Bravo and Canalizo acting as his substitutes during two intervals of absence with the army. He was again constitutional president, under the instrument of June 12, 1843, from June 4 to Sept. 20, 1844, when he was deposed by a new revolution, taken prisoner near Tlaxolula on Jan. 15, 1845, banished for 10 years, and took up his residence in Cuba. The two succeeding presidents, Herrera and Paredes, found themselves unable to grapple with the difficulties under which the country was laboring, aggravated as they were by the war just breaking out with the United States. Santa Anna was recalled, and by the connivance of the American government, which, for reasons that have never been made known, supposed him favorable to peace and to recognizing the independence of Texas, he was permitted to pass through the fleet and reach Mexico in safety. There, contrary to the opinion entertained in the United States, he declared vigorously for the war, and was appointed generalissimo by the provisional government under Salas, and in December was made provisional president. Immediately after, at the head of 20,000 men, the flower of the Mexican army, he advanced northward, and on Feb. 22, 1847, attacked the American troops at Buena Vista, 5,000 strong, under Gen. Taylor. He was effectually repulsed, but nevertheless maintained his reputation and popularity, and collected a new army for the defence of the eastern frontier. In the mean time Anaya was elected president, and Santa Anna taking command of his troops intrenched himself at Cerro Gordo, where on April 18 he was attacked and defeated by the Americans under Scott. Yet in spite of these disasters, he was enabled to collect 3,000 men from the fragments of his broken army, and, retreating toward the national capital, halted at Ayutla. There he was informed of his appointment to the presidency, as it was felt by the Mexicans, amid all their disheartening reverses, that he was the only one who could make head against the Americans with any prospect of success. But finding subsequently that the election for president which the states had held on May 15 was unfavorable to his pretensions, he prevailed on congress to postpone the counting of votes until Jan. 1848, and in the mean time banished or imprisoned all those opposing his schemes, and established a severe censorship of the press. During the course of the year he carried on secret negotiations with Scott, and Trist the American commissioner, with questionable sincerity, and certainly with no result. He organized an army of 30,000 men for the defence of the capital. The battles of Contreras and Churubusco followed (Aug. 19 and 20, 1847),



and the next day an armistice, proposed by Gen. Scott, was accepted by him, which suspended hostilities till Sept. 8. The battle of Molinos del Rey was fought Sept. 9; and on Sept. 16, 1847, the city of Mexico was captured, having previously been evacuated by the officers of the government. Santa Anna now resigned the executive chair to Peña y Peña, who had been constitutionally elected his successor, and, though he despaired of successfully resisting the party of peace in Mexico, he made a last effort to retrieve his reputation by the siege of Puebla; but he was attacked by Gen. Lane at Huamantla, and forced to retire from the place, which was now relieved. In the middle of January, 1848, an attempt was made to surprise him at Tehuacan, where he was lurking, but failed; and about Feb. 1 Santa Anna informed the minister of war and the American commander-in-chief that he desired to leave Mexico, and "seek an asylum on a foreign soil, where he might pass his last days in that tranquillity which he could never find in the land of his birth." The desired permission was granted, and on April 5, 1848, he took passage from La Antigua to Jamaica. In that island he remained several years; but the anarchical condition of Mexico under the presidencies of Herrera and Arista turned men's eyes once more upon him, and returning to Mexico in 1853, he was received with great enthusiasm. He was appointed president for one year, after which time he was to call a constituent congress; but he fomented a new revolution by which he was declared president for life, with power to appoint his successor, and the title of most serene highness. He began to rule with despotic authority, and the revolution of Ayutla followed, led by Gen. Alvarez. After a struggle of two years, Santa Anna, finding himself without resources, since he had spent the ten millions of the Gadsden treaty, signed his unconditional abdication, and sailed (Aug. 16, 1855) from Vera Cruz for Havana. He afterward went to Turbaco, Venezuela, for two years, and has since resided in the island of St. Thomas. He is generally regarded as the ablest of the Mexican generals, and the wildest of Mexican politicians.

**SANTA BARBARA**, a S. W. co. of Cal., bounded W. and S. by the Pacific, and N. E. by the coast range, and drained by Santa Clara, Santa Maria, and Guimaraes rivers; area, about 4,300 sq. m.; pop. in 1860, 3,543. It is chiefly a stock-growing district, but a large part of the land is also suitable for tillage, and the uplands are well timbered. Gold is found, and bitumen, sulphur, silver, and copper are abundant. There are many very productive salt springs. The productions in 1857 were 4,000 bushels of wheat, 20,000 of barley, 15,000 of oats, 25,000 of Indian corn, 5,000 of beans, 4,000 of potatoes, 24,000 lbs. of wool, 100 tons of grapes, and 3,000 galls. of wine. Capital, Santa Barbara.

**SANTA CATARINA**, a S. province of Brazil, bounded N. W. and N. by Parana, E. by the

Atlantic, and S. and S. W. by Rio Grande do Sul; area, 33,800 sq. m.; pop. in 1856, 105,000. Separated from the coast by a strait varying from 1 to 7 m. in width is the island of Santa Catarina, some 30 m. long by 10 broad. The capital, Nossa Senhora do Desterro, and some of the chief towns of the province stand on the island. The strait forms 2 excellent harbors; and the island has numerous streams, a good climate, and a fertile soil. The coast of the mainland is low, but the ground rises toward the interior, where it becomes mountainous. Many rivers fall into the Atlantic, and the Uruguay rises in this province. The soil is in general exceedingly fertile, and large tracts are covered with forests. The productions include both those of the tropics and temperate regions.

**SANTA CLARA**, a W. co. of Cal., watered by the Guadalupe, Pajaro, and Santa Cruz rivers; area, 1,000 sq. m.; pop. in 1860, 11,912. It occupies the fertile valley between the coast range and Santa Cruz mountains, and yields gold, silver, and quicksilver. The New Almaden and Guadalupe quicksilver mines are in this county. The productions in 1858 were 145,000 bushels of wheat, 160,000 of barley, 25,000 of oats, 1,500 of Indian corn, 5,000 of potatoes, 5,000 of onions, 200,000 lbs. of butter, 250,000 of cheese, 55,000 of wool, and 15,000 galls. of wine. There were 12 grist mills, 12 saw mills, 1 iron foundry, and 2 colleges. Capital, San José.

**SANTA CRUZ**, a W. co. of Cal., bordering on the Pacific, bounded S. by the Rio Pajaro; area, 500 sq. m.; pop. in 1860, 4,945. The soil in the valleys is productive. The Santa Cruz range of mountains runs along the N. E. border. Gold and limestone are found. The productions in 1858 were 98,250 bushels of wheat, 200,000 of barley, and 58,400 of oats. There were 6 grist mills, 10 saw mills, and 4 tanneries. Capital, Santa Cruz.

**SANTA CRUZ, or SAINT CROIX**, an island of the West Indies, 65 m. E. S. E. from Porto Rico, the largest and southernmost of the Virgin group, forming with St. Thomas and St. John the Danish government of the West Indies; length 20 m., breadth 5 m.; pop. 25,600. The surface is level, with a range of low hills in the N. There are numerous streams, and the soil is fertile. The temperature ranges between 54° and 72°, but hurricanes and earthquakes are frequent. Nearly the whole island is cultivated, about half being planted with sugar cane. Santa Cruz was discovered by Columbus on his second voyage, and has since been at different times in the hands of the Dutch, British, Spanish, and French, the last of whom ceded it to Denmark. The British took it in 1807, but restored it to the Danes by the treaty of Paris. English is the language generally spoken. Capital, Christianstadt.

**SANTA CRUZ**, the capital of the Canary islands, situated upon the N. E. coast of the island of Teneriffe; pop. about 8,000. There are some churches, 3 hermitages, and several

schools. The harbor is very good, and has a fine long mole. The place is strongly fortified.

SANTA FE, an E. co. of New Mexico, drained by the Rio Grande and small streams which fall into that river; area, about 1,500 sq. m.; pop. in 1860, 8,114. The surface is mountainous, and the soil poor and sandy. The productions in 1850 were 26,962 bushels of Indian corn, 11,499 of wheat, and 6,506 lbs. of wool. It contained 13 churches and 2 newspaper offices.—SANTA FE, the capital of the preceding county and of the territory of New Mexico, stands in a wide plain surrounded by high mountains, and at an elevation of 7,047 feet above the sea; pop. in 1860, 4,635, mostly mestizos. The streets are irregular and narrow, and the houses mostly built of adobes. There are two Catholic churches in the city, and it has a tri-weekly and a weekly newspaper. It was taken by Gen. Kearny in Sept. 1846.

SANTA MAURA (anc. *Leucadia* or *Leucas*), one of the Ionian islands, in the Ionian sea, separated by a strait 1 m. wide from the W. coast of the Grecian district of Acarnania; area, 180 sq. m.; pop. in 1858, 20,043. The principal towns are Santa Maura or Amaxichi, the capital, and Vliko, both on the E. coast. The island is traversed N. and S. by a limestone ridge, terminating at the S. W. in Cape Ducato (the ancient Leucas, Leucatas, or Leucate, famous for Sappho's leap), and culminating near the centre of the island in Mount St. Elias, 3,000 feet high. The whole surface is more or less broken; only about  $\frac{1}{4}$  of it is cultivated; and the crop of grain is insufficient for home consumption. Oil, wine, currants, wheat, maize, and salt are produced.—The ancient Leucas (Gr. λευκος, white) derived its name from the limestone cliffs. In the time of Homer it was united to the mainland at the N. E. extremity by an isthmus which was cut through by the Corinthians about the middle of the 7th century B. C. The town of Leucas, which was founded near the isthmus by the Corinthians, became the head-quarters of the Acarnanian league, and was taken and plundered by the Romans in 197 B. C. On the promontory of Leucas was a temple to Apollo, and at the annual festival of the god it was customary to cast a criminal from the rock into the sea. Birds of all kinds were tied to him to break his fall, and if he survived the plunge boats were ready to save him. This expiatory rite gave rise to the story that lovers leaped from this cliff to obtain relief from the pangs of love.

SANTA ROSA, a W. co. of Fla., bordering on Alabama, watered by the Yellow and Black-water rivers, and washed on the S. W. by Pensacola bay and Escambia river; area, 1,500 sq. m.; pop. in 1860, 5,481, of whom 1,872 were slaves. The surface is flat and the soil poor. The productions in 1850 were 10,328 bushels of Indian corn, and 12,790 of sweet potatoes. There were 22 saw mills, 3 ship yards, a cotton mill, 3 churches, and several schools. Santa Rosa island is off the S. shore. Capital, Milton.

SANTANDER, a province of Spain, in Old Castile, bounded N. by the bay of Biscay, E. by the province of Biscay, S. by Burgos and Palencia, and W. by Asturias; area, 8,434 sq. m.; pop. in 1857, 214,441. Santander, the capital, is the only important seaport on the coast. The Cantabrian mountains stretch along the S. boundary of the province, and many offsets extend from that range toward the coast. Between these there are fertile valleys. Limestone, marble, gypsum, and potters' clay are abundant; and iron and argentiferous lead mines are worked. Leather, cotton goods, iron, &c., are manufactured. Ship building is carried on. The people are better educated than the Spanish generally. The principal towns, beside the capital, are Santana, Santillana, and Reynosa.—SANTANDER (anc. *Portus Blendium*), the capital, is situated on an arm of the bay of Biscay, in lat. 43° 28' N., long. 3° 41' W.; pop. about 20,000. It has a secure harbor, and is built partly upon level ground, and partly upon the slopes of the neighboring hills. There is a cigar manufactory in a suppressed convent, where about 3 tons of cigars are made each week. The other manufactures consist of iron, leather, casks, candles, &c. The trade, principally with Cuba, is considerable. The value of the exports in 1856 was \$1,816,765, and of the imports \$4,883,055. *Portus Blendium* was a place of importance in Roman times, but afterward became reduced. On the discovery of America it was made a port of trade with the Spanish possessions there and in the West Indies. The town was sacked by Sout in 1808.

SANTANDER, FRANCISCO DE PAULA, president of New Granada, born in Rosario de Cucuta, April 2, 1792, died in Carthagena in 1840. When the revolution of 1809 broke out he embraced the side of independence, and was made colonel and served under Gen. Serviez. When the Spaniards under Morillo overran New Granada, Santander retired to Venezuela, where he acted in conjunction with Bolivar. The general congress which met at Rosario de Cucuta in Jan. 1821, united Venezuela and New Granada into one state under the name of the Colombian republic, of which in October of that year Bolivar was elected president and Santander vice-president. During the absence of the president, Santander discharged his duties and devoted himself to the improvement of the finances, the fostering of public education, and developing the resources of the country. In 1827 Bolivar and Santander were reelected; but as the monarchical principles of the former began to exhibit themselves, Santander became the head of the republican party. Bolivar however succeeded in gaining absolute authority, and Santander was subsequently charged with a share in an unsuccessful plot to kill the dictator. He was banished from the country, and during his exile visited England, France, and Germany. After Bolivar's death he returned, and in March, 1832, the Colombian republic

having been dissolved, was elected president of the republic of New Granada for 4 years.

SANTÉE, a river of South Carolina, formed by the Congaree and Wateree, which unite near the middle of the state, whence it flows in a S. E. direction into the Atlantic by two mouths in lat.  $33^{\circ} 6' N$ . The main stream is about 150 m. long, and steamboats ascend to Columbia on the Congaree, and Camden on the Wateree. Its lower part is skirted by rice swamps and forests of pitch pine.

SANTERRE, ANTOINE JOSEPH, a French revolutionist, born in Paris in 1752, died there, Feb. 6, 1809. He was a brewer in the faubourg St. Antoine, where he was popular among the lower classes, and was considered as the principal agent of the duke of Orleans, who was suspected of plotting the overthrow of his cousin, Louis XVI. On the insurrection of July 14, 1789, Santerre brought his men to the attack of the Bastille, but was not concerned in the murder of the governor Delaunay. In Feb. 1791, he figured at the head of the mob who attempted to destroy the castle of Vincennes, but were prevented from accomplishing their design by Lafayette. On July 17 of the same year he was instrumental in the popular manifestation at the Champ de Mars against the continuance of the king on the throne after his flight to Varennes; and on its suppression by the national guard under Lafayette and Bailly, Santerre fled to a farm house near Lagny. Reappearing after the amnesty granted on the adoption of the constitution by the king, he found his control over the inhabitants of the faubourg St. Antoine greater than ever; he led them to the Tuileries on June 20, 1792, presided over the banquet given to the Marseillais by the city of Paris, played a conspicuous part in the insurrection of Aug. 10, became commander of the national guards after the death of Mandat, and was afterward appointed special keeper of the Temple with the rank of brigadier-general. His treatment of the prisoners, though commonly rude and cruel, now and then displayed a touch of compassion. He conducted the king from the Temple to the scaffold, and was said to have ordered the drums to beat when the royal victim attempted to address the bystanders, but denied it. On the rising of the royalists in La Vendée, he was placed at the head of a division of the republican army, which, owing to his incapacity, was signally routed at Coron, near Chollet, Sept. 18, 1793. Returning to Paris in disgrace, he was imprisoned as an Orleanist, but released after the fall of Robespierre. On the 18th Brumaire Gen. Bonaparte, having heard that Santerre was secretly trying to arouse the people of his quarter, sent him word that he would have him shot if there was any disturbance there. The faubourg remained quiet, and to reward his obedience Bonaparte confirmed Santerre in his rank of brigadier-general, and allowed him to stay in Paris, where he spent his latter years in obscurity.

SANTIAGO, a central province of the republic of Chili, bounded N. W. by the province of Valparaiso, N. by Aconcagua, E. by the Argentine confederation, S. by Colchagua, and W. by the Pacific ocean; area, 7,204 sq. m.; pop. in 1857, 293,113. The chief towns are Santiago, the capital of Chili, and Rancagua. The Andes extend along the E. frontier, and reach the elevation of 22,450 feet in the peak of Tupungato, the highest point, according to Gilliss, in Chili. Between the mountains and the W. boundary there are beautiful and fertile valleys. The principal rivers are the Mapyu and its tributary the Mapocho. Gold, silver, copper, iron, lead, and several other metals are found in the province, but only the first three are worked. Large numbers of cattle are reared, and jerked beef is exported to all parts of the N. coast.

SANTIAGO DE CHILI, the capital of the preceding province and of the republic of Chili, situated on both sides of the Mapocho, at the foot of the Andes, in lat.  $33^{\circ} 35' S$ , long.  $70^{\circ} 44' W$ , 90 m. E. S. E. from Valparaiso; pop. 107,000. The streets are broad, regular, and lighted with gas; and in the centre of the city there is a beautiful avenue, lined with 4 rows of poplar trees, with streams of water between them, and having a fountain at one end. The cathedral is a fine building, but has been seriously injured by earthquakes. The university of Santiago, established in 1738, has faculties of philosophy, mathematics, physical sciences, medicine, law, and theology. The city has also a national institute, a military and naval academy, a normal school, a daily and a weekly newspaper, beside several other periodicals, a library of 23,000 volumes, and a museum. The higher classes are generally well educated. The houses are seldom more than one story high, and are built opening into a court in the interior to afford a place of refuge for the occupants during earthquakes. A partial supply of water is conveyed to the town in pipes, but most of what is used is brought in casks upon the backs of animals. Santiago is connected with Valparaiso by a railway, and another to Talca is in course of construction. Tolerable carriage roads lead both to the N. and S.; and there are two passes across the Andes practicable for mules, by which some commerce is carried on with Mendoza. The chief trade is with Valparaiso. The exports consist of gold, silver, lead, and various kinds of raw produce; and the imports of manufactured goods, wines, spirits, and other articles of luxury. The manufactures are trifling, and consist of some coarse cloth and pottery.—Santiago was founded in 1541 by Pedro de Valdivia, but it is only since the independence of Chili that it has made much progress in wealth and independence. Since the railways and gas works were introduced, a large number of emigrants from England and the United States have settled here.

SANTIAGO DE COMPOSTELA (anc. *Campus Stella*), a city of Spain, in the province of

Corunna, and formerly the capital of Galicia, situated on the Sar, 33 m. S. S. W. from Corunna; pop. 30,000. It is the see of an archbishop, and beside the cathedral, built in the 11th century on the site of one much older, contains 2 collegiate and 15 parish churches, a hospital for pilgrims founded by Ferdinand and Isabella, a university, a number of suppressed convents, and manufactories of hats, leather, hosiery, and cotton. Its chief support is the pilgrims who resort hither to visit the shrine of St. James (Sant' Iago) the apostle, whose body, according to the legend, having been miraculously discovered by a hermit, was removed to this place in 829. A cathedral was built over it, and a city sprung up around the cathedral. The bones of the saint are popularly believed to have been built into the foundations of the present edifice. (See PILGRIMAGE.) The number of pilgrims has much decreased in modern times. The Latin name, Campus Stellæ, "field of a star," is supposed to be derived from a star which pointed out to the hermit the resting place of the apostle's body.

SANTIAGO DE CUBA, the capital of the Oriental department of Cuba, and of a province of its own name, on the Santiago river, 6 m. from its mouth on the S. coast; pop. in 1853, 24,253. It is the see of an archbishop, and has a cathedral, several churches, a hospital, a college, convents, &c. Steamers connect it with Manzanilla, Santa Cruz, Trinidad, Cienfuegos, and Batabano, on the coast. It has suffered severely from earthquakes.

SANTILLANA (SANTA JULIANA), ISIGO LOPEZ DE MENDOZA, marquis of, a Spanish poet and statesman, born at Carrion de los Condes, Aug. 19, 1398, died in Guadalajara, March 26, 1458. On the death of his father, who was grand admiral of Castile, he was left heir to immense estates, which were wrongfully kept from him; but he recovered them at the age of 18 and acted a conspicuous part during the reign of John II. He was long and successfully engaged in the war against the Moors, and was an opponent of the royal favorite, the constable Alvaro de Luna; but after the fall of that minister he took little part in political affairs. He was the founder of the Italian school in Spanish poetry. His most important work is the *Comedieta de Ponza*. He made a collection of proverbs at the request of the king for his son, afterward Henry IV. His works were edited with notes by Don José Amador de los Rios (Madrid, 1852).

SÃO PAULO, a S. province of Brazil, bounded N. by Minas Geraes, E. by Rio de Janeiro and the Atlantic, S. by Parana, and W. by Matto Grosso and the republic of Paraguay; area, 171,062 sq. m.; pop. in 1856, 500,000. There are some good harbors on the coast, the principal of which is Santos. The N. E. part of the coast is bold and rocky, and the S. W. low. The land rises rapidly toward the interior, and terminates in forest-clad mountains, which run nearly parallel to the coast. The

river Parana forms the W. boundary of the province, and receives from it the Iguacu, the Tieté, and numerous other rivers. The valleys and plains are exceedingly fertile, and the climate mild and healthy. The principal productions are sugar, coffee, rice, millet, tobacco, &c. Horses, cattle, and swine are sent by land to Rio de Janeiro. Capital, São Paulo.

SÃO PEDRO DO RIO GRANDE. See RIO GRANDE DO SUL.

SAÔNE (anc. *Arar*; in the middle ages, *Segona* or *Saucona*), a river of France, having its source at Vioménil, in the S. W. of the department of Vosges. Taking a general S. direction through the departments of Haute-Saône, Côte d'Or, and Saône-et-Loire, and forming the boundary between the departments of Rhône and Ain, it finally unites with the Rhône at Lyons. Its length is 280 m., of which 190 m. are navigable for steamboats. The town of Gray is the head of navigation at the ordinary height of the river, but during an overflow large rafts, loaded with staves, iron, and other heavy produce, descend from the department of Vosges to Gray. Its principal affluents are the Oignon, Doubs, and Seille on the left bank, and the Ouche and Grone on the right. Thé Burgundian, central, and Rhône and Rhine canals connect it with the Rhine and the Seine. Though usually a gentle stream, it has at times been subject to destructive floods; 6 of these are on record, the first in A. D. 580, and the last in 1840, which produced great loss of property and life at Lyons.

SAÔNE-ET-LOIRE, an E. department of France, formed from the ancient province of Burgundy; area, 3,315 sq. m.; pop. in 1856, 575,018. It is crossed from N. to S. by a mountain range, the highest point of which is 3,280 feet above the sea, and is watered W. of this ridge by the Loire, and E. by the Saône. The surface is diversified and the soil only moderately fertile. The grape is the principal crop, and the wines are of fair quality. Coal, iron, and manganese are extensively mined. The most important manufactures are iron, leather, glass, linen and cotton goods, and earthenware. The celebrated forges and founderies of Creuzot are in this department. Capital, Mâcon.

SAP, in botany, the fluid imbibed from the soil by plants and carried through their tissues, being the usual source of their nutrition and of their peculiar secretions. The external agencies in the vital principle of plants are water, heat, and light. Water does not exist in nature in a pure state, but is constantly combined with earthy, saline, and gaseous matters. Most plants are furnished with roots, and these organs are so contrived that they can absorb these aqueous solutions, transmitting them through the different tissues to the various parts. This transmission is called the circulation of the sap, and alterations in its constituents are continually going on in its progress, that nearer the roots being destitute of certain principles which are found higher up

the stem. Thus, before the sap reaches the leaf buds and leaves, a considerable change has taken place; but when exposed to the light by means of the expanded leaves a greater one occurs, which may be termed digestion, consisting in the decomposition of carbonic acid, the giving out of its oxygen into the air, and the combination of the carbon with other elements to form the various secretions of the plant, such as gum, sugar, starch, lignine, &c. The manner in which each plant elaborates from the same soil its essential products remains as yet unexplained. The cause of the motion of the sap has been a fruitful source of speculation among physiologists, and for a long time capillary attraction was adopted as the most probable. The opinion of Dutrochet, that exosmose and endosmose were the explanation, is now most generally received. Two special motions called rotation and cyclosis are also known. The former is to be seen in the joints and cells of certain aquatic plants, such as *valisneria*, *chara*, *nitella*, &c. This rotatory motion of greenish globules floating in the sap may be increased by raising the temperature till it reaches 77° F. Cyclosis occurs in such plants as have spiral vessels, and especially in the tissues of such as secrete a milky fluid known as the *latex*, which seems to bear the same relation to the plant that the blood does to the animal, and is more slightly organized and separated from the other fluids. To inspect these phenomena the compound microscope must be employed.

**SAP GREEN**, a pigment used as a water color, prepared from the inspissated juice of the buckthorn, *rhamnus catharticus*.

**SAPAJOU**. See **MONKEY**.

**SAPAN WOOD**, the wood of the tree *Cesalpinia sapan*, imported from the East Indies as a dye stuff. The tree grows on the coast of Coromandel, the eastern islands, in Pegu and Siam, and is of the same genus with that which affords the Brazil wood. The dye it produces is red, but of inferior quality to that of the latter wood. The root of the sapan is imported from Singapore, and produces a yellow dye.

**SAPHIR**, **MORITZ GOTTLIEB**, a German humorist, born in Pesth, of Jewish parents, in 1794. He engaged in commerce at Vienna, but his propensity for jest and satire involving him in difficulties which obliged him to leave that city, he went first to Berlin and afterward to Munich, and published in those places until 1833 several humorous journals. Having obtained permission to return to Vienna, he has edited there since 1837 a journal entitled *Der Humorist*. He has also published several collections of a similar character. In 1832 he became a Protestant.

**SAPPHIRE** (Gr. *σάπφειρος*), the name given to the glassy varieties of the mineral species corundum, which rank as gems, including those of bright blue colors commonly known as sapphires; those of bright red, termed rubies; the colorless, called white or water sapphire;

and those of violet, yellow, and green, known respectively as the oriental amethysts, topaz, and emeralds. These all consist of nearly pure alumina crystallized in the rhombohedral system, ranking in hardness next to the diamond, designated as 9 on the scale of hardness, and of specific gravity 3.909 for the ruby and 3.979 for the blue sapphire. The mineral is not altered before the blowpipe, nor affected by acids; by friction it is rendered electrical. Though the name was used by the Greeks, it appears, according to the descriptions of Pliny, Theophrastus, Isidorus, and others, to have been applied to other stones of a blue color; while under the name of *asteria* Pliny gives a correct description of one variety of the sapphire, which is distinguished by the appearance of a whitish star of 6 rays, when the crystal is cut perpendicularly to its axis and held between the eye and a strong light. The colorless sapphire, by reason of its fine lustre and extreme hardness, is often mistaken for the diamond; the specific gravity is a convenient test for distinguishing them. The fine ruby sapphires used in jewelry are nearly all obtained from Ava. They are found in the mountains near the town of Syriam, and like diamonds are sought for among the sands in the beds of rivers in districts of crystalline rock, such as granular limestone, the granitic rocks, and metamorphic slates. The blue sapphires are found under similar circumstances in Ceylon. Inferior crystals of the different varieties have been found in several European countries and in the United States. Vernon on the N. line of New Jersey, and the adjoining towns of Warwick and Amity in New York, have afforded crystals of red, bluish, and pink colors from the granular limestones of that region; and Newton, N. J., crystals of blue sapphire. Red sapphire has also been found in Cherokee co., Ga.—Sapphires rank next to the emerald in value, but the rubies of two carats are even more valuable than diamonds. Nothing is so brilliant as the magnificent red color they exhibit when cut and polished. Occasionally rubies sell for more than diamonds of the same weight, as at the sale of the collection of the marquis of Drée, when a very fine diamond of 8 grains (2 carats) sold for 800 francs, and a ruby of the same weight for 1,000 francs. In the same sale a ruby of 10 grains brought 14,000 francs. Rubies are sold in the United States at discretionary prices depending on their fineness and color, and varying from \$3 to \$20 per carat. The finest sapphires are retained by the East Indian potentates in whose possessions they are found. Among the finest in Europe are two belonging to Miss Burdett Coutts of London, valued at £30,000, and one of 133 carats belonging to the Hope collection. One in the imperial museum in Paris, without a blemish and weighing 132½ carats, was once sold for 170,000 francs. In Ava a blue sapphire was seen by the English embassy of 951 carats, and another is reported there of 310 carats. Sapphires were formerly

set with a foil of corresponding color, as one of red glass for the ruby, a silver or blue foil for the blue, and a black back for the water sapphire; but they are now set *à jour*, that is, without back. Beside their use as gems, the water sapphires make excellent lenses for microscopes; the mineral is also used as a plate through which to draw the finest wires, a minute hole for this purpose being drilled by means of a diamond point; it is also valuable for jewelling pivot holes of watches.—Artificial crystals of alumina, which are sapphires and rubies with the exception only of the colors, have been obtained at different times by MM. Ebelman, De Senarmont, and Gaudin. The first produced microscopic crystals by slowly evaporating a solution of alumina in boracic acid; the second by exposing closed glass tubes containing water and hydrates of alumina and silica to a temperature of 180° C., whereby distinct crystals of alumina and silica were obtained. By M. Gaudin's process equal parts of calcined and pulverized alum and sulphate of potash are introduced into a brasqued crucible, which is then submitted for a quarter of an hour to intense heat of a forge fire. On breaking the crucible a black concretionary mass of sulphuret of potassium is found covered with fine brilliant points, which are crystals of alumina. The black matter being dissolved out with acidulated hot water, the fine white sapphires may be collected at the bottom, where they appear like diamond powder. Each grain under the microscope appears beautifully limpid. Metallic oxides introduced to impart colors are generally destroyed by their reduction through the action of the carbonaceous lining of the crucible; and thus almost all attempts to obtain colors have failed. In a few instances extremely minute rubies have been observed adhering to the facets of a sapphire. The largest crystals obtained have not exceeded  $\frac{1}{10}$  of an inch in length and about  $\frac{1}{4}$  as thick. These were excessively hard, and consequently well adapted for the jewelling of watches.

SAPPHO, a Greek lyric poetess, born in Mytilene in the island of Lesbos, flourished probably between 630 and 570 B. C. The events of her life are to be gathered chiefly from obscure allusions in her own writings, or in those of authors who flourished many centuries after her. She was contemporary and lived in friendly intercourse with her countryman, the poet Alcaeus, and was married to one Cercolas of Andros, by whom she had a daughter, Cleis, of whom, as well as her brothers, she makes occasional mention. At about the commencement of the 6th century she fled to Sicily, but whether she returned to Mytilene is not known. The common story that, being in love with a youth named Phaon, she leaped in despair from the Leucadian rock, is now regarded as having originated in certain highly poetical or metaphorical expressions used by the authoress. Her poems are principally erotic compositions for the single voice, and not for the chorus;

but she also wrote on a variety of other subjects, serious as well as satirical, and is said to have first employed the Mixolydian mode in music. The Attic comic poets delighted in introducing her into their dramas as a courtesan; but Welcker, in his *Sappho von einem herrschenden Vorurtheil befreit* (Göttingen, 1816), K. O. Müller, Neue, and other modern commentators, have attempted to vindicate the poetess from this and other aspersions. The poems of Sappho were arranged by the later literary Greeks in 9 books according to their metres; but of these productions only one complete ode, that to Aphrodite, and a number of short fragments, remain. She wrote in the Æolic dialect, and is said to have invented the metre which bears her name, although she by no means confined herself to it. Among Latin poets her most successful imitators were Catullus and Horace. It was formerly the custom to print her literary remains in editions of the pseudo Anacreon, and it was not until 1733 that a separate edition of any portion of them appeared. Since that time numerous collections and critical editions have been published, the most elaborate being that of Volger (8vo., Leipsic, 1810), and the best that of Neue (4to., Berlin, 1827).

SARACENS (Lat. *Saraceni*), a name of unknown etymology, originally designating an Arab tribe, in which sense it is used by Pliny, and the description of whom by Ammianus Marcellinus agrees perfectly with the character of the Bedouins. It was afterward applied to all the Arabs who embraced the religion and spread the conquests of Mohammed; and by the Christian writers and the crusaders of the middle ages it was extended to all the Mohammedans of various races who invaded Europe, and against whom they fought in the East.

SARAGOSSA (Sp. *Zaragoza*), a province of Spain, in Aragon, bounded N. E. by Huesca, S. E. by Teruel, S. W. by Guadalupe and Soria, and N. W. by Logroño and Navarre; area, 11,783 sq. m.; pop. in 1857, 384,176. It is crossed by several ranges of hills, between which lie broad level tracts; the valley of the Ebro, which traverses the province from N. W. to S. E., is nearly 80 m. wide. Gypsum, alabaster, jet, lead, iron, copper, argentiferous galena, and sulphur are found. The plains are fertile. Olive oil and excellent wine are produced. There are large tracts of forest, from the timber of which much charcoal is made. The manufactures are not extensive.—SARAGOSSA, the capital of the province and of the ancient kingdom of Aragon, is situated on the Ebro, 180 m. N. E. from Madrid; pop. 82,189. It stands in a fertile plain upon the S. side of the river, and is connected with its suburb on the opposite bank by a stone bridge erected in 1437. It is surrounded by strong walls with 8 gates. The place has an antiquated and gloomy appearance. There are 2 cathedrals, in each of which the chapter resides alternately for 6 months. The church of Santiago is

said to be built upon the site where the apostle St. James lodged. The clock tower of San Felipe is built of brick and highly ornamented, and diverges about 9 feet from the perpendicular. The university, which has upward of 1,000 students, was founded in 1474, and formerly occupied a fine building and had a valuable library. The citadel stands outside the N. W. gate of the city; it was built as a palace by the Moors, was afterward used by the inquisition, and has since been occupied in succession as a barrack, hospital, and prison. The principal manufactures are silk, cotton, linen, and woollen goods, and leather.—Saratogossa derives its name from Cæsar Augustus, who colonized it 25 years B. C. It was a free city, had a mint, and was the seat of judicial assizes. It was captured in the latter part of the 5th century by the Goths, and in 712 by the Moors, who retained it till 1118, when Alonso el Batallador retook it after a siege of 5 years, during which a great part of the population perished by famine. In 1710 the French under Philip V. were defeated in the immediate neighborhood of Saratogossa by the British under Gen. Stanhope. It was besieged by the French in 1803, and the citizens under the command of Palafox defended the town for two months, when the invaders in consequence of their defeat at Baylen were forced to retire. It was again invested by the French marshals Lannes, Mortier, Moncey, and Junot, and made a gallant defence for 62 days, when it capitulated, Feb. 20, 1809. During these two sieges 60,000 men were killed.

SARATOGA, an E. co. of N. Y., bounded E. and partly N. by the Hudson river, and S. by the Mohawk; area, 780 sq. m.; pop. in 1860, 51,732. The surface is mountainous in the N. W. Iron ore, sandstone, and limestone are abundant. The central portion abounds in mineral springs, the chief of which are those of Saratoga and Ballston. The productions in 1858 were 147,601 bushels of wheat and other winter grain, 1,357,588 of Indian corn and other spring grain, 52,744 tons of hay, 487,072 bushels of potatoes, 289,478 of apples, 1,468,136 lbs. of butter, and 152,902 of cheese. In 1855 there were 4 cotton and 4 woollen factories, 7 paper mills, 8 furnaces, 9 tanneries, 33 grist mills, 80 saw mills, 12 newspapers, 103 churches, and 215 school houses. The Champlain canal passes along the E. border of the county, and the Erie along the S., and 5 railroads traverse it. Capital, Ballston.

SARATOGA, BATTLE OF. On Sept. 14, 1777, the expedition of Burgoyne crossed the Hudson by a bridge of boats and encamped on the heights and plains of Saratoga, near Fish creek, within a few miles of the northern division of the continentals under Gen. Gates, who had advanced to Stillwater. Kosciuszko had fortified and held Bemus's heights; the right wing occupied a hill nearest the river, and Arnold commanded the left wing about  $\frac{1}{4}$  of a mile further removed. Next day the right

wing of the British advanced to within 4 m. of the American lines, and on the 19th made a further forward movement of 2 m. It was led by Burgoyne, and consisted of Canadians and Indians, supported by a body of grenadiers and light infantry under Gen. Fraser. Gen. Morgan, who had been detached about noon to observe the movements of the enemy with his sharpshooters, drove back the advance guard, but coming upon the main column was himself compelled to retreat. Reinforcements coming up under Arnold, a severe conflict ensued, commencing about 4 o'clock and continuing until dark, when it was suspended, each claiming the victory. The loss of the Americans was within 400, that of their adversaries about 500. This contest is called variously the battle of Saratoga, Stillwater, and Bemus's heights. Frustrated in this attempt, his communications with Canada cut off by the seizure of the posts at the outlet of Lake George, and his supplies intercepted by the capture of a large fleet of boats with provisions and 300 men, Burgoyne's only hope was in Sir Henry Clinton, who had promised to attempt the ascent of the Hudson for his relief. Burgoyne fortified his camp, but, after waiting 3 weeks, had no alternative but to hazard a battle; and on Oct. 7, seconded by Major-Generals Phillips and Riedesel, and Brigadier-General Fraser, he advanced with 1,500 picked troops, 2 12-pounders, 2 6-pounders, and 2 howitzers, to within one mile of the American camp. Scouts were sent out with orders to make a diversion in the rear, but they were discovered by the advance guard of the Americans. Two detachments were ordered to advance, one under Gen. Poor against the British left, and one under Morgan against their right; and scarcely had the enemy placed themselves in order of battle when they were furiously assailed on both flanks. On the left the Americans advanced against the British grenadiers and artillery, and, having been joined by Arnold (who, maddened by the excitement of battle, had rushed without orders to the head of the detachment, and assumed the command), took and lost the batteries again and again until the enemy had been driven off and their own guns turned upon them. Morgan in the meanwhile had attacked the enemy's right under Fraser, who was fatally wounded by a sharpshooter. This, followed by a reinforcement of the Americans, threw the British into confusion, and Burgoyne, abandoning his artillery, retreated to his camp in good order. Here he was again desperately assailed by the Americans, who succeeded at last in carrying a portion of the camp and driving off the Hessian reserve by which it was defended. Arnold, who led the last charge, was severely wounded in the leg. Night closed the contest; the victors lay on their arms near the battle field, and Burgoyne abandoned his camp and moved about a mile to the north, taking possession of some heights which lay near the river, protected by



a ravine in front. Gen. Gates contented himself with energetic efforts to cut off the enemy's retreat. On the 9th Burgoyne retreated to Saratoga, where he found a detachment of Americans throwing up intrenchments, but who crossed the river to join a force under Gen. Fellows. On the 10th the whole British force occupied their former camp, which they proceeded to strengthen in the hope of succor from Sir Henry Clinton should they not be able to effect a retreat. An American battery under Gen. Fellows commanded the passage across the river, the bridges on the road to Fort Edward were destroyed, and Gates with about 12,000 men appeared on the S. side of Fish creek prepared for battle. Without an avenue of retreat, continually exposed to the fire of Gates's and Fellows's batteries and the riflemen of Morgan, without provisions for more than a few days, and despairing of relief from Clinton, Burgoyne, after consultation, on Oct. 13 proposed a cessation of hostilities until terms of capitulation could be agreed upon. Gates demanded an unconditional surrender, which was rejected; and he finally agreed, on the 15th, to more moderate terms, influenced by the possibility of Sir Henry Clinton's arrival. In the night of the 16th, the articles of capitulation not having been signed, Burgoyne received despatches from Sir Henry Clinton announcing the capture of Forts Montgomery and Clinton, but after some hesitation formally agreed to the conditions. They provided that the British were to march out with the honors of war, and to be furnished a free passage to England under promise of not again serving against the Americans. These terms were not carried out by congress, and most of the captured army, with the exception of Burgoyne, were retained as prisoners while the war lasted. The Americans obtained by this victory, at a very critical period, an excellent train of brass

artillery, consisting of 42 guns of various caliber, 4,647 muskets, and a large supply of ammunition. The prisoners numbered 5,791, and the entire American force at the time of the surrender was 13,222, including the sick and those absent on furlough, whose number was upward of 2,000.

**SARATOGA SPRINGS**, a township and village of Saratoga co., N. Y., 38 m. by railroad N. by W. from Albany; pop. in 1860, 6,521. The mineral springs, which have given to this place its celebrity, are almost the only natural attraction of the town, the scenery being generally tame and uninteresting. Saratoga lake, 3 m. from the village, is however a very fine sheet of water. There are 22 hotels, 7 churches, 2 female seminaries, 2 banks, 5 printing offices, and 2 public halls. The number of visitors during the season, which lasts from about June 20 to the end of August, ranges from 25,000 to 35,000. The medicinal virtue of the High Rock spring was known to the Indians many years before the revolutionary war; in 1767 Sir William Johnson was brought hither on a litter, and was greatly benefited by the waters. The first hut was erected in 1773 by Derick Scowton, and the first framed house in 1784 by Gen. Schuyler. There are in all 23 or 24 springs, some of them chalybeate, others impregnated with iodine, and all charged with carbonic acid gas. The most celebrated are the Congress (see CONGRESS SPRING), Empire, and Iodine springs. High Rock spring, the first discovered, has a mound of calcareous tufa, 3½ feet high and 24½ feet in diameter at the base, deposited by the water of the spring around its outlet. An aperture at the top of the rock, a foot in diameter, gives access to the spring, which formerly overflowed this natural vase. The following table gives an analysis of 11 of the most noted springs, the figures showing the number of grains of each ingredient in a gallon of water:

Ingredients.	Columbian, analyzed by Dr. J. H. Steele.	Congress, Dr. J. H. Steele.	Empire, Dr. E. Emmons.	Flat Rock, Dr. J. H. Steele.	Hamilton, Dr. J. H. Steele.	High Rock, Dr. J. H. Steele.	Iodine, Dr. Allen.	Magne- sian, Dr. Thomas.	Pavilion, Dr. Thomas.	Putnam, Dr. J. R. Chilton.	Washing- ton, Dr. J. H. Steele.
Chloride of sodium....	267.00	885.00	269.896	148.87	279.30	159.10	147.06	160.23	226.68	214.00	281.50
Iodide of soda.....	2.56	8.50	12.000	1.88	8.00	2.50	3.56	1.70	2.75	2.00	2.75
Bicarbonate of soda....	15.40	8.93	80.848	20.79	27.04	17.54	.....	.....	.....	.....	16.50
Carbonate of soda.....	.....	.....	.....	.....	.....	.....	8.00	10.40	4.70	14.32	.....
Sulphate of soda.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.68	.....
Carbonate of magnesia	.....	.....	.....	.....	.....	.....	73.35	44.26	62.50	51.60	.....
Bicarbonate of ".....	46.71	95.79	41.954	42.70	83.20	61.59	.....	.....	.....	.....	40.92
Carbonate of lime.....	63.00	98.10	.....	60.57	92.40	69.29	23.95	48.00	60.24	68.50	92.60
Phosphate of lime.....	.....	.....	141.824	.....	.....	.....	.....	.....	.....	.21	.....
Bicarbonate of lime.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Carbonate of iron.....	5.53	6.07	.....	5.39	5.39	5.53	.90	.....	.....	7.00	3.25
Bicarbonate of iron.....	.....	.....	.....	.....	.....	.....	.....	.....	4.10	.....	.....
Silica.....	2.05	1.50	.....	.....	.....	.....	.....	1.10	.62	.54	1.50
Alumina.....	.....	.....	.....	.....	.....	.....	.....	.80	.35	.56	.....
Hydrobromate of pot- assa.....	trace	trace	trace	trace	trace	trace	.....	.....	.....	.....	.....
Total solid contents..	407.30	597.94	496.832	279.65	442.33	345.60	257.42	266.46	361.74	361.01	439.03
Carbonic acid gas (inches).....	272.06	811.00	.....	287.50	316.00	304.00	344.30	371.00	480.01	348.88	262.50
Atmospheric air.....	4.50	7.00	.....	6.50	4.00	5.00	2.50	3.25	5.09	6.41	6.80
Total gaseous contents	276.56	818.00	700.000	294.00	320.00	309.00	346.05	374.25	488.10	355.29	269.80

These waters are regarded as specially beneficial in diseases of the liver, in some cases of

chronic dyspepsia, and in chronic affections of the bowels. They are generally tonic and

greatly cathartic. Large quantities of the waters, especially of the Congress and Empire springs, are bottled and exported.

**SARATOV**, a S. E. government of European Russia, bounded N. by Penza and Simbirsk, E. by Samara, S. by Astrakhan, and W. by the country of the Don Cossacks and Tambov; area, 31,577 sq. m.; pop. in 1856, 1,622,147. It is traversed by the Volga, the land E. of which forms a barren steppe, while that on the W. is undulating and diversified, and fertile in the N. In the W. there are some streams which flow toward the Don, and in the E. are several salt lakes, the soil also being strongly impregnated with salt.—**SARATOV**, the capital, is situated on the right bank of the Volga, 459 m. S. E. from Moscow; pop. about 62,000. It is surrounded by a wall and ditch, and contains several churches, 2 monasteries, and a mosque. Canvas, cotton goods, cordage, and leather are extensively manufactured.

**SARAWAK**, a rajahship or kingdom of Borneo, situated near the W. corner of the island, extending from Cape Datto on the W. to the river Samarahan on the E., between lat.  $1^{\circ} 8'$  and  $1^{\circ} 58'$  N. and long.  $109^{\circ} 19'$  and  $110^{\circ} 39'$  E.; area, 8,000 sq. m. The land is low and undulating in the neighborhood of the sea, but mountainous in the interior. The soil is generally a rich black mould, yielding all tropical products. There are mines of gold, antimony, and nickel, which are worked to some extent. Coal, diamonds, and various precious stones are also found. The aboriginal inhabitants, called Dyaks, consist of various wild tribes, speaking for the most part distinct languages. The Malays became their rulers, and reduced to slavery those they could capture; but an Englishman named Brooke by the assistance of the Dyaks became sovereign of the country in 1841. (See **BROOKE**, **SIR JAMES**.) The import and export trade of Sarawak are estimated together at nearly \$2,000,000 per annum.—**SARAWAK**, the capital, stands upon a river of the same name, about 15 m. from the sea, in lat.  $1^{\circ} 33'$  N., long.  $110^{\circ} 20'$  E.; pop. 15,000. The trade is very considerable, and is carried on chiefly with Singapore. Large vessels can enter the river, but cannot ascend to the town. The approach to Sarawak is commanded by a fort mounting 6 guns.

**SARCOPHAGUS** (Gr. *sarx*, flesh, and *phagō*, to eat), a species of stone coffin in which the ancient Romans placed the bodies of the dead which were not intended to be burned. It was frequently made of the Assian stone, brought from Assus in Troas, to which was ascribed the fabulous quality of consuming the body placed in it, with the exception of the teeth, in 40 days. Subsequently the name was applied to any coffin or tomb. The most celebrated specimen of the sarcophagus is one of alabaster, discovered by Belzoni at Thebes, and now in the Soane museum, London.

**SARD** and **SARDONYX**, precious stones, varieties of carnelian or chalcedony, named

either from Sardis in Lydia, where they were originally found, or from the Greek *sarx*, flesh, in allusion to the flesh-like colors they sometimes exhibit. The sard is marked by concentric zones or small nebulosities in the middle of its ground, which distinguish it from red carnelian. Its color is a dark reddish brown almost black by reflected light, and a deep red inclining to blood red by transmitted light. When it alternates in bands with white chalcedony, it is called sardonyx (sard and onyx). Specimens of sard engraved by the ancients are still preserved in European collections; but the name was indefinitely applied by the Romans to the various agates and carnelians. Dufrénoy designates true flesh-colored agates as sards, those with alternating white stripes as sardonyx, and the deep reddish brown or orange red agates as sardoines.

**SARDANAPALUS**, the last king of the Assyrian empire of Ninus. According to Ctesias, his effeminacy and licentiousness excited a rebellion against him, headed by Arbaces, satrap of Media, and Belesys, the noblest of the Chaldean priests. In the moment of danger he showed unexpected vigor, defeated the insurgents in several battles, and, when at last forced to retreat to Nineveh, sustained a siege of two years. When it became evident that the city could be held no longer, he collected all his treasures and his women, and placing them on an immense pyre perished with them in the flames. The date of the event has been variously assigned to 876, 710, and 606 B. C. The utter impossibility of reconciling the chronology of this account with that given by other authorities, has led many writers to distrust the whole narrative, and to consider Sardanapalus a myth. K. O. Müller sought in an ingenious and elaborate essay to prove the identity of the god Sandon with Sardanapalus. His name, however, is thought to have been deciphered in the cuneiform inscriptions, and the events of his reign to have been recovered from independent texts now in the British museum. (See **NINEVEH**.)

**SARDINE**, a small and well known fish of the herring family, and genus *alosa* (Cuv.). It is regarded by Valenciennes and most ichthyologists as identical with the fish called pilchard on the coasts of Great Britain, though Cuvier made it distinct, giving it the specific name of *sardina*. On the former assumption no description is here necessary. Its flesh is very delicate. The fishery employs a great number of men and women on the coasts of Brittany, and to a less extent of Portugal. The vessels are generally of 8 or 10 tons each, with a crew of 6 to 10; they go 2 or 3 leagues from land, and when they see fish spread their gill nets, scattering their bait, which consists of the eggs and flesh of fish, especially of the cod and mackerel, and sometimes salted fish and crustaceans. Some are salted on board, and the others are carried on shore, and either consumed fresh, or salted, or preserved in olive oil and melted

butter for exportation; the tin cases in which they are packed are familiar to all. The larger fish are called *celans* in France, and pilchards in England; their shoals are preyed upon by codfish, and especially by porpoises. Fish of many other genera of the herring family are called sardines. In the East Indies species of *clupeonia*, *spratella*, *korala*, and *Dussumiera* (the last named belonging to the *erythrinidæ*) are placed on the table as sardines, and have a delicate flavor; in the West Indies *harengula clupeola* (Val.) is called the Spanish sardine, and *pellona Orbignyana* (Val.) in South America; many other species on our coast, if preserved in olive oil, would doubtless be as delicious as the European sardine.

SARDINIA (Ital. *Sardegna*; anc. *Ichnusa* and *Sardinia*), next to Sicily, the largest and most important island in the Mediterranean sea, lying N. of Africa, N. W. of Sicily, W. of southern Italy, E. of Spain and the Balearic islands, and S. of Corsica, and extending from lat.  $38^{\circ} 52'$  to  $41^{\circ} 16'$  N., and from long.  $8^{\circ} 10'$  to  $9^{\circ} 50'$  E. On the W. and S. it is washed by the Mediterranean proper, and on the E. by the Tyrrhenian sea, and it is separated from Corsica by a narrow strait called Bocche di Bonifacio; length 166 m., breadth 96 m.; area, including several small adjacent islands, 9,391 sq. m.; pop. in 1852, 543,200; in 1858, 573,115. Its shape is oblong, and its coasts are generally steep and rugged, with deep indentations especially on the W. and S. On the E. side are Capes Figueri, Cavallo, Comino, Monte Santo, Bellavista, Ferrato, and Carbonara, and the bays of Terranova, Orosei, and Tortoli. The gulf of Cagliari cuts a wide semicircular opening on the S. between Capes Carbonaro and Spartivento, beyond which are Cape Teulada and the bay of Teulada or of Isola Rosa. On the W. shore, going northward, are the bay of Palma; the bay of Oristano, at whose entrance are the promontories La Frasca on the S. and San Marco on the N.; Capes Mannu, Malargia, Caccia, Argentaro, Negretto, and Falcone. East of this last point the N. coast, after forming the gulf of Sassari, makes a semicircular sweep to Punta la Testa or Longo-Sardo, the northernmost point of Sardinia. The principal small islands lying off the coast are the group of Magdalena, among which is Caprera, near the E. mouth of the Bocche di Bonifacio; the island of Tavolara, S. E. of Cape Figueri; Agullastro, S. of Cape Monte Santo; Serpentara and Costelazzo, near Cape Carbonaro; San Antioco and San Pietro, W. and N. W. of the bay of Palma; Mal di Ventre, opposite Cape Mannu; and Asinara, N. of Cape Falcone.—More than  $\frac{2}{3}$  of the surface is occupied by mountains. The main chain, which runs N. and S. across the island, as well as its offshoots, belongs chiefly to the palæozoic formation; the N. range, called Mount Limbara, is mostly granitic; while the hills extending through the centre from Porto Torres to Cagliari are of tertiary calcareous formation. In many parts of the island,

and especially in the N. E., there are extinct volcanoes. The highest summit is the Punta Bruncu-Spina, in the Genargentu or central range, 6,293 feet above the sea. In the opinion of geologists Sardinia was once united to Corsica, from which it has been severed by some volcanic convulsion. The rivers are numerous, but small; the most important are the Tirso or Oristano, which flows from the N., drains the centre of the island, and falls into the gulf of Oristano, and the Orosei, Flumendosa, Mannu, and Coghinias. The principal lakes are those of Cagliari, Sarno, and San Giusta. The island abounds in mineral resources, which are very imperfectly developed. Its ancient silver mines are abandoned, but there are 11 lead mines in operation. Iron, copper, mercury, antimony, granite, marble, porphyry, jasper, amethyst, gypsum, and alabaster are found, and large beds of coal were discovered near Iglesias in 1851. Salt is obtained on the coast, and there are numerous mineral springs. The coral fishery is an important branch of industry.—The soil is peculiarly rich. Wheat and barley are produced nearly everywhere; maize is supposed to occupy about  $\frac{1}{4}$  of the cultivated land. In the vicinity of Milis, near the W. coast, there is an orange forest, whose trees are far larger than the finest that are seen in Portugal. Other fruits are also produced in abundance; and the wines are remarkable for spirit and flavor. Tobacco is raised near Sassari; cotton thrives near Cagliari; flax, hemp, and saffron are produced; and during the last 30 years white mulberries have been extensively planted. The cork, oak, pine, chestnut, and other trees clothe the slopes of the mountains almost to their summits. There are annually exported about 60,000 skins of hares and rabbits, 5,000 of foxes, and 2,000 of martens. The moufflon, an animal of the sheep kind, which is believed to be indigenous to the island, frequents the highest and most secluded woods. An enormous quantity of cheese is made from sheep's and goats' milk. The coasts abound in tunny, anchovies, pilchards, &c.; but the fisheries are mostly in the hands of foreigners.—The climate is agreeable, especially in the high grounds; the summer heat is not so overpowering as on the continent, and winter is comparatively mild, there being little snow except on the higher mountains. The low lands, which are mostly marshy, are subject in the autumn to deadly malaria, here called *intemperie*.—Sardinia was anciently reckoned one of the granaries of Rome; but its prosperity has been seriously checked by a long period of misgovernment. It was not until 1836 that feudal tenure and feudal jurisdiction were entirely abolished, and agriculture is still backward. Manufactures are also in their infancy. Beside the royal manufactories of gunpowder, salt, and tobacco (the last two being crown monopolies), there are a few others of cotton, woollen, and silk goods, and some coarse pottery and glass works. In 1852 the value

of exports amounted to \$2,069,190, most of which found their way to the Sardinian states on the continent. The chief items were as follows: wheat, \$944,800; wines, \$286,700; coral, \$221,690; raw hides, \$149,490; tunny, \$136,140; cheese, \$106,095. The imports, which consisted of cotton goods, silk, fine linen, drugs, groceries, &c., amounted to \$1,870,370, of which \$649,335 came from France and \$72,000 from the United States. The number of vessels owned in the island was 937.—Sardinia was formerly divided into 2 administrative divisions, Cagliari and Sassari, and 11 provinces, subdivided into districts and communes. Its present divisions, under the organization of the kingdom of Italy, are 2 provinces and 9 arrondissements. It is governed by a viceroy, who generally holds office for 3 years. It has a parliament, called the *stamenti*, consisting of 3 chambers, the ecclesiastical, the military, and the royal, which are convoked at the king's pleasure, and have consequently very little influence. The supreme council of Sardinia, which is composed of a president and 5 senatorial councillors, has its seat at Turin and full control over the affairs of the island. Each commune has also its council and a *sindaco* or mayor. Justice is administered by police courts and tribunals of original jurisdiction, above which are the "royal audience" and the superior court, under a regent, whose powers are next to those of the governor. The Roman Catholic is the only religion. There are 3 archbishoprics (Cagliari, Sassari, and Oristano) and 8 bishoprics. Public education has of late years been considerably improved. Every village or commune has a primary free school, and each province its normal school, beside two secondary schools at Cagliari and Sassari, which are also the seats of universities; the number of pupils in these establishments is estimated at about 9,000. The public revenue in 1855 was reckoned at about \$819,050, nearly half of which was derived from the custom house, \$160,000 from the tobacco monopoly, and \$80,000 from that of salt.—The island was originally settled by the Phœnicians and Etruscans, and afterward by the Greeks, who founded several towns here in 512 B. C. It fell into the hands of the Carthaginians, and in 238 B. C. was occupied by the Romans, under whom it reached a high degree of prosperity. It was wrested from the western Roman empire by the Vandals, who in the 5th century conquered the N. coast of Africa, and extended their power over all the islands of the Mediterranean. On the destruction of their kingdom by Belisarius in the 6th century, Sardinia became a part of the Byzantine dominions; but the emperors of Constantinople, being unable to protect this distant colony, recalled their troops, and it was offered as a prey to the ambition of the Arabian chiefs, who in the 7th century subdued Africa, and tried to conquer Sardinia, but were unable to secure more than some districts along the coast until after the

dissolution of the Carolingian empire. They were finally expelled in 1022 by the Pisans and Genoese, who disputed its possession with each other for about 150 years, until the emperor Frederic Barbarossa, siding with the Genoese, established their vassal Barisone as king of Sardinia, and caused him to be crowned at Pavia, Aug. 5, 1164; but in the following year the emperor, changing his mind, granted the island to the Pisans. The contest went on again until, in 1175, Frederic, in the capacity of umpire, divided the island about equally between the two rival republics. In 1238 the emperor Frederic II. made his natural son Enzo king of Sardinia, by marrying him with Adelasia, the heiress of the two divisions, styled the judicatures of Torri and Galluri. Finally, in 1297, Pope Boniface VIII. gave the investiture of Sardinia to King James II. of Aragon, on condition that he should pay tribute and become a vassal of the holy see. James overcame the Pisans, who had till now maintained their ground, and became sole and uncontested master in 1326. For 4 centuries the island remained a part of the Spanish dominions. By the treaty of Utrecht (1713) it was surrendered to the emperor Charles VI. of Germany, who in 1720 gave it, in exchange for Sicily, to Duke Victor Amadeus II. of Savoy; this prince then assumed the title of king of Sardinia, and it is still in possession of his descendants.

SARDINIAN STATES (It. *Stati Sardi*), or the KINGDOM OF SARDINIA (It. *Regno Sardo*), a part of the new kingdom of Italy, formerly consisting of two separate divisions, the island of Sardinia and the continental possessions (*Stati di Terra Ferma*). The latter included the duchy of Savoy and the county of Nice, now annexed to France; the principality of Piedmont, with the marquisesates of Saluzzo and Montferrat and the western part of what was once the duchy of Milan; and the duchy or republic of Genoa. They thus comprised the whole W. part of N. Italy, and were bounded N. by the Swiss canton of Geneva, and by the lake of Geneva and the Pennine Alps, by which they were divided from the cantons of Vaud and Valais; E. by an offshoot of the same mountains, separating them from the canton of Tessino, by Lake Maggiore and the river Ticino, which formed their frontier toward Lombardy, then for a few miles by the Po, continuing that frontier, and finally by the duchies of Parma and Modena; S. by the Mediterranean (gulf of Genoa); and W. by the Var, the Cottian Alps and their ramifications, and the Isère, the Guiers, and the Rhône, separating them from France. This last frontier line has been altered by the treaty of Turin (1860), so that, Savoy and Nice being ceded to France, the main Alpine range, under its various appellations of Graian, Cottian, and Maritime Alps, now forms the W. border of N. Italy. Through the Alpine passes there are some magnificent roads, such as those of the Simplon, the Great and the Little St. Bernard, Mont Ge-

nèvre, Mont Cenis, &c., connecting Italy with Switzerland and France. The main chain, in its vast windings, encircles that fertile and magnificent plain which stretches toward the Adriatic and is drained by the Po. Among the tributaries of the Po are, on the left, the Doria Riparia, Doria Baltea, Sesia, and Ticino, the last flowing from Lake Maggiore; and on the right, the Tanaro, Scrivia, and Trebia. The physical characteristics of the various parts of this kingdom are described under other heads. (See GENOA, NICE, PIEDMONT, SARDINIA, SAVOY, &c.) The whole kingdom, prior to the annexation of central and S. Italy and the consolidation of the kingdom of Italy, comprised 14 administrative divisions, the area and population of which in 1857 were as follows:

Administrative divisions.	Area in sq. m.	Population.
Turin.....	2,249	680,868
Genoa.....	1,250	570,433
Savona.....	1,019	244,949
Nice.....	1,750	256,608
Coni, or Cuneo.....	2,712	618,513
Alessandria.....	1,517	498,946
Novara.....	2,189	480,886
Ivrea.....	1,795	257,507
Verceili.....	1,185	401,573
Chambéry.....	2,515	313,591
Anney.....	1,763	267,942
Cagliari ..	9,391	296,238
Nuoro ... }		123,914
Sassari ... }		157,185
Total.....	20,253	5,180,642

The population in 1838 was 4,650,368, of which the Stati di Terra Ferma contained 4,125,785 and Sardinia 524,623. In 1848 the former had 4,368,975 inhabitants, and the latter 547,112; total, 4,916,087.—Until 1848 the government of the kingdom was an absolute monarchy, but on March 4 of that year Charles Albert granted a constitution, styled the *statuto fondamentale del regno*, and the king has since reigned with the assistance of two representative houses, a senate consisting of life members and a chamber of elective deputies. The cabinet or council of ministers is composed of the ministers of finance, foreign affairs, the interior, justice and public worship, public instruction, war and the navy, public works, and general control, each of whom is assisted by secretaries and directors. The minister of finance is president of the council. The higher administration is completed by the council of state and the *reggia camera de' conti* or superior audit court. The administrative powers, under the council of ministers, are intrusted to an *intendente generale* for each division, an *intendente* for each province, and a *sindaco* for each town or commune, each of them being assisted by a council. Justice is administered according to the *Codice del regno Sardo*, which is in substance the same as the *Code Napoléon*. Beside a high court of cassation at Turin, there were 7 courts of appeal, at Turin, Chambéry, Casale, Genoa, Nice, Cagliari, and Sassari; a tribunal of original jurisdiction in the chief town of each prov-

ince or *intendencia*; and justices of peace in each of the *mandamenti*. There are also tribunals of commerce in several of the most important towns, and an admiralty court at Turin.—Public instruction is the object of special attention. Four universities, attended by about 1,800 scholars, exist at Turin, Genoa, Cagliari, and Sassari, the first in rank being that of Turin, which has 8 chairs of theology, 14 of law, 14 of medicine, 12 of humanities, and 14 of natural philosophy and mathematics. They are under the control of a high board of administration. Classical education is given in 116 colleges, 6 of which are styled national, 36 royal, 9 episcopal, and 65 public; to which must be added technical schools and seminaries for theological studies, there being one of the latter in every diocese. Primary instruction has been improving of late, and is liberally supported by the communes and the public. The number of public schools in 1857 was 6,072 for boys and 3,246 for girls; the former were attended in winter by 244,649, and in summer by 144,510 pupils; the latter by 150,225 during the cold and 88,086 during the hot weather. There were 429 private schools for boys and 859 for girls, with an average attendance of 7,250 for the former and of 16,500 for the latter. The expenditure for the public schools amounted to \$746,415, of which \$477,125 was for the male and \$269,290 for the female department; of this the communes paid \$579,290, the balance being furnished by endowments (\$96,780), private donations (\$36,190), and the state (\$34,205). Of the teachers, 3,055 were ecclesiastics and 8,917 laymen. In 1848, out of a population of 4,916,087, there were 754,309 males and 823,535 females able to read and write, while 195,504 males and 230,899 females were able to read only. The island of Sardinia was far below this average, there being out of 547,112 inhabitants only 68,484 males and 4,238 females able to read and write, and 2,928 males and 3,082 females able to read only. Within the last 12 years marked improvement has taken place in this respect.—The religion of the state is the Roman Catholic, but toleration and equality of civil and political rights are extended to every other persuasion. There are about 28,000 Waldenses, who inhabit some valleys of W. Piedmont, amid the Maritime Alps; they have 15 parishes and a college. The Jews, whose number, though estimated much higher by some travellers, does not probably exceed 10,000, are scattered over the whole country; they have 20 synagogues. The Roman Catholic establishment consisted of 7 archbishoprics (Turin, Chambéry, Genoa, Verceili, Cagliari, Oristano, and Sassari), 35 bishoprics, and 4,253 parishes. Monastic orders, with the exception of such as are actually employed in "preaching, teaching, or tending the sick," were suppressed by law, May 28, 1855. Previous to that measure, there were 71 of those orders, forming 604 communities, 137 of which were of importance. Among these, 80 con-

vents for monks had 781 inmates, and 57 for nuns 1,085; the mendicants amounted to 2,806; in all, 4,172. The landed property of the clergy on the continent only was estimated at \$5,675,700, and their yearly income from all kinds of property at \$3,255,150. The net yearly income of the suppressed communities of monks and nuns was \$372,490.—In 1858 the army comprised 53,380 men, thus distributed: 20 infantry regiments, 28,000; sharpshooters or *bersaglieri*, 11 battalions, 6,600; corps of engineers, artillery, &c., 12,235; *cacciatori* (irregulars), 780; cavalry, 9 regiments, 5,715. The army in 1860 was constituted as follows: staff, 213; 56 regiments of infantry, 122,723; 27 battalions of *bersaglieri*, 16,028; 17 regiments of cavalry, 12,504; 8 of artillery, 16,004; 2 of sappers and engineers, 5,570; carabinieri, 6,121; other troops, 13,497; total, 183,081. This army is raised by conscription on the continent and voluntary enlistment in Sardinia. Each soldier must perform 8 years' active service in the army, at the expiration of which he is henceforth exempt, provided he has received no leave of absence during that period; or he has to serve actively for 5 years in the provincial battalions, and 6 years more in the service. The annual demand for soldiers was formerly estimated at 10,000, but this is now far below the mark. In 1858 the fleet amounted to 40 ships, carrying 900 guns, viz.: 4 sailing and 4 steam frigates, with 60 guns each, 4 corvettes, 3 brigs, 1 schooner, 10 steamers, &c., manned by nearly 3,000 sailors, under 93 officers, among whom were 1 admiral, 2 rear admirals, 7 captains, and 7 post-captains. Naval affairs are under the control of a chief commander, two boards of officers, and a council of admiralty. The financial condition of the kingdom is not satisfactory. The public debt in 1847 was about \$19,360,000, and in 1856 \$131,841,600, most of it bearing 5 per cent. interest. Nearly \$30,000,000 was added to it by the campaign of 1859. In that year, according to the statement of Count Cavour, the anticipated revenue was \$27,905,850, and the expenditure \$28,847,475, showing a deficit of \$941,625. Nearly  $\frac{1}{4}$  of the revenue (\$6,495,265) was required for the payment of interest. The army and navy took \$7,841,382, public works \$2,793,980, and public instruction \$435,510. The revenue is for the most part derived from direct taxes, excise, and customs. Notwithstanding the annual deficit and increasing public debt, the credit of the kingdom has remained unimpaired.—Agriculture, although flourishing in some places, requires many improvements, and manufactures have also been much neglected. Those of silk however are prosperous. The following table shows the growth of foreign commerce from 1852 to 1858, distinguishing the "general commerce," or total import and export trade, from the "special commerce," or that in domestic products and articles for domestic consumption only. The official values are given:

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## GENERAL COMMERCE.

Years.	Imports.	Exports.
1852.....	\$68,538,665	\$45,408,615
1853.....	64,084,575	42,340,290
1854.....	59,957,160	41,437,350
1855.....	63,721,120	47,081,065
1856.....	74,555,570	55,677,925
1857.....	80,124,710	57,955,565
1858.....	80,922,120	61,486,262

## SPECIAL COMMERCE.

Years.	Imports.	Exports.
1852.....	\$31,972,430	\$17,151,845
1853.....	26,082,265	18,187,000
1854.....	23,256,925	21,044,400
1855.....	29,716,170	25,826,380
1856.....	46,993,700	29,974,945
1857.....	47,338,478	37,120,909
1858.....	49,466,538	31,886,604

The principal article of trade is silk, the imports of which in 1856 amounted to \$8,690,795, the exports to \$14,601,140. Among the other imports were: cotton, raw and manufactured, \$8,400,000; coffee, sugar, and colonial produce, \$6,000,000; wheat, maize, rice, &c., \$5,000,000; wool, \$4,075,000. Among the exports were: wine and brandies, \$2,765,000; wheat, maize, rice, &c., \$2,460,000. The countries most interested in this trade were, in order, France, Great Britain, Lombardy, Switzerland, and the United States. The merchant marine in 1857 comprised 2,934 vessels, measuring 197,924 tons, and manned by 33,370 sailors. The inland commerce has been greatly enlarged by the recent construction and improvement of roads. In Jan. 1859, there were 570 miles of railway in operation; the most important were those placing Turin in direct communication with Genoa, the Ticino, and Coni, and those between Alessandria and Arona, and Oluzo and St. Jean de Maurienne.—The origin of this kingdom dates from the negotiations which followed the treaties of Utrecht and Rastadt, and brought about the quadruple alliance, Aug. 2, 1718. (See SAVOY.) Victor Amadeus II. of Savoy, under the compulsion of Austria, France, and England, exchanged Sicily for Sardinia by special agreement, Aug. 24, 1720, and henceforth styled himself king of Sardinia. In 1730 he resigned in favor of his son Charles Emanuel III., on condition of receiving a yearly pension of 400,000 francs. Before the expiration of one year he tried to resume his authority, but the attempt failed, and he was arrested, and died a prisoner in 1732. Charles Emanuel III. (1730-'73), a still more skilful ruler than his father, took advantage of the contests that were raging between the great European powers to enlarge his possessions. An ally of France and Spain in the war of the Polish succession, he received on the peace of Vienna (1738) the territories of Tortona and Novara. During the war of the Austrian succession he sided with Maria Theresa; and the treaty of Aix la Chapelle (1748) gave him the county of Anghiera with the territories of Vigevano and Pavia. Meanwhile his states prospered under his administration; the burden of taxes which

the maintenance of a large army had rendered necessary was alleviated, and a code of laws, styled the *Corpus Carolinum*, was published in 1770. His son, Victor Amadeus III. (1773-'96), reigned peacefully until the French revolution broke out, when, having adhered to the European coalition, and declined receiving the French ambassador, he became involved in a war with the new republic. Nice was taken and Piedmont invaded in 1792; but being supported by subsidies from England and the pope, he resolved to hold his ground, and act in concert with Austria. He lost the battle of Loano, Nov. 23, 1795, was overpowered by Bonaparte in 1796, and after a fortnight's campaign, during which his troops were defeated at Millesimo (April 13 and 14) and Mondovi (April 21), was obliged to sign a treaty of peace, June 3, which took from him Savoy and the county of Nice. Five months later he died, and was succeeded by his son Charles Emanuel IV., who, despite repeated assurances of his friendship to the French republic, was suspected of hostile designs, deprived by Gen. Joubert (Dec. 9, 1798) of all his continental possessions, and forced to retire to the island of Sardinia. Piedmont was formally annexed to France, Sept. 11, 1802, and until 1814 the continental possessions of the kingdom of Sardinia remained a part of the French empire. Meanwhile Charles Emanuel had abdicated and entered the order of Jesuits. He was succeeded by his brother Victor Emanuel I. (1802-'21), who, after an insignificant reign of 12 years in the island, was restored to his continental possessions on the fall of Napoleon. He reentered Turin May 20, 1814. The first peace of Paris had left to France a small part of Savoy; but this was reannexed to Sardinia by the second peace of Paris, while the congress of Vienna added to this kingdom the territory of the former republic of Genoa (Dec. 1814). Absolutism was reinstated with Victor Emanuel. The burden of taxation soon fostered discontent; and secret societies, especially those of the *carbonari*, found numerous adherents in the army and among the nobles, Prince Charles Albert himself being one of their number. In Feb. 1821, a military insurrection, headed by Counts Palma, Lissio, and Santa Rosa, broke out simultaneously in Alessandria, Asti, Pinerolo, and several other places. The insurgents had for their motto: "War against Austria! Hurrah for the constitution!" Santa Rosa, who had carried nearly the whole army with him, entered Turin; roused its inhabitants, and demanded of the king a liberal constitution. Victor Emanuel, unwilling to confront Austria or to betray his own subjects, resigned in behalf of his brother Charles Felix, who was then at Modena, and in his absence appointed Charles Albert regent, who solemnly proclaimed the constitution; and established a provisional government. Meanwhile Russia and Austria were arming to oppose the revolution. King Charles Felix, still in Modena, protested against what had been done by

the regent, and appointed Count Salieri della Torre to the command of the troops that remained loyal. Prince Charles Albert on the other hand, after appointing (March 21) Santa Rosa minister of war, escaped to the Austrian army, which was marching under Bubna toward Piedmont, and resigned the regency. Santa Rosa was defeated, April 9, near Rieti; the Austrians entered Turin, April 18, and Charles Felix was restored to his authority. The elder branch of the house of Savoy becoming extinct in his person, April 27, 1831, Charles Albert, who belonged to the younger branch, that of Carignan, and whose claims to the crown had been formally acknowledged by the congress of Vienna, ascended the throne. After following for several years in the footsteps of his predecessors, he yielded to his former prepossessions, in 1848 granted the *statuto fondamentale*, presented himself as the champion of Italy, and engaged in a war against Austria, but was compelled to a truce, and after resuming the war, was finally defeated at Novara, March 23, 1849. (See CHARLES ALBERT.) The same evening he disappeared, leaving the government to his son Victor Emanuel II., who had fought bravely during the whole day. He began his reign by signing an armistice with the conquerors and sending troops to secure Genoa, which was on the point of proclaiming itself a republic. Peace with Austria was signed Aug. 6, 1849, the new king giving up all his claims to Lombardy and consenting to pay an indemnity of 75,000,000 francs. He adhered however to a liberal policy, renewed his oath to the *statuto fondamentale*, and surrounded himself with the most approved members of the constitutional party, D'Azeglio, Cavour, and La Marmora. He aimed at strengthening his government by a system of gradual reform in the internal administration, and restoring Sardinia to that rank among the European powers which she had lost by her last reverses. Improvements took place in all the branches of government; industry was fostered, and commercial treaties were concluded with foreign nations. Abroad, especially by joining the Anglo-French alliance in the Crimean war (1855), Sardinia acquired even more than her former political importance; and when, in 1859, she was attacked by Austria, she not only found France by her side, but was supported by public opinion generally, and even by former republicans like Garibaldi, as the champion of Italian independence. In a short campaign Lombardy was conquered. The preliminaries of Villafranca and the peace of Zurich (Nov. 10, 1859), succeeding the victories of Magenta and Solferino, however, left many questions of importance undecided. (See ITALY.) Napoleon III., at least ostensibly, favored the formation of an Italian federation, while Sardinia aimed at the consolidation of the whole peninsula into a single kingdom. Assisted by Garibaldi and the people, who in various parts of Italy rose in his favor, Victor Emanuel energetically



cally pursued this purpose. Count Cavour, who on the preliminaries of Villafranca had resigned, resumed, Jan. 20, 1860, the ministry of foreign affairs and the premiership of a new cabinet. Parma and Modena were at once annexed. In March the people of Tuscany and the Æmilian provinces of the Papal States were called to decide by vote whether they would be annexed to the constitutional monarchy of Victor Emanuel II. or form a separate kingdom. An overwhelming majority was given in favor of annexation, and the title of kingdom of Sardinia was changed to that of kingdom of Italy. Soon afterward Savoy and the county of Nice, which had been ceded to France by the treaty of Turin, March 24, sanctioned the transfer by a nearly unanimous vote, and were taken possession of by the delegates of Napoleon III. An insurrection having broken out in Sicily, Garibaldi, who had resigned his rank as a general and his seat as a deputy, assembled volunteers in and around Genoa and made preparations to assist the insurgents; and the ministry, in spite of remonstrances from several European governments, refused to interfere. (See SICILIES, THE TWO.) Sardinia meanwhile prepared for every emergency; an army, under La Marmora, had been stationed along the Mincio and the Po to prevent any attack from the Austrians; another of 20,000 troops, under Cialdini, kept the frontier of the Æmilia on the E. slope of the Apennines; and a third of 30,000, under Fanti, was concentrated at Arezzo, overlooking the valley of the Tiber. On Sept. 11, Garibaldi having entered Naples, Cialdini and Fanti were both ordered to move forward. The latter marched toward Perugia, which he entered on the 13th, while the former, after taking possession of Urbino, advanced toward Ancona, routed the papal troops under Lamoricière at Castelfidardo, made 4,000 prisoners at Loreto, besieged Ancona, where Lamoricière had taken refuge, and forced the general to surrender. Garibaldi authorized the predictator Pallavicino, whom he had appointed, to issue a *plebiscite* summoning the people of the Two Sicilies to decide upon their annexation to the kingdom of Italy. The vote was taken Oct. 21, and out of 1,420,000 voters, 1,310,000 declared for annexation. During this time Fanti and Cialdini had marched their troops into the Abruzzi, and Victor Emanuel had slowly advanced toward Naples. On the 26th he met Garibaldi at Teano, and entered Naples Nov. 7, in company with the "liberator," amid popular applause. Umbria and the march of Ancona had also voted for annexation; and Victor Emanuel found himself the sovereign of a kingdom numbering 22,000,000 inhabitants, and, after the surrender of Gaëta, which was for some time obstinately defended by Francis II. of Naples, including the whole of Italy with the exception of the territory of Rome and the province of Venice. All the exertions of his government are now directed toward organizing the new

provinces, and suppressing the insurrectionary warfare here and there carried on in the Neapolitan provinces by squads of the disbanded army of Francis II. and other marauding gangs. Count Cavour died in June, 1861, and was succeeded by Baron Ricasoli.

SARDIS, or SARDES, an ancient city of Asia Minor, capital of the kingdom of Lydia, situated in a fertile plain between Mount Tmolus on the S. and the river Hermus on the N., and near the Pactolus. It is now a heap of ruins, in the midst of which stands the little Turkish village of Sart. The walls of the acropolis are still standing on a steep hill, at the foot of which are the remains of a large and once magnificent temple, supposed to have been dedicated to Cybele. Among the other ruins are those of two Christian churches, a theatre, and a stadium. It is conjectured that Sardis was identical with the Homeric Hyde. Herodotus relates that the acropolis was fortified by Meles, the king who preceded Candaules. In the reign of Ardys (686-637 B. C.) the city was taken by the Cimmerians, but they were unable to carry the acropolis. Upon the overthrow of the Lydian monarchy Sardis became the residence of the Persian satraps of western Asia. On the revolt of the Ionians, the city, except the citadel, was taken by them with the assistance of an Athenian force and burned; but it was rebuilt, and the indignation of Xerxes at its destruction determined him to wage war against Athens. It surrendered to Alexander the Great after the battle of the Granicus (334), and upon his death came into the hands of Antigonus. It soon after became a Syrian, and subsequently a Roman possession, and in the time of Tiberius was reduced to a heap of ruins by an earthquake, and again rebuilt. In the book of Revelation Sardis is addressed as one of the 7 churches of Asia, and it continued to be a wealthy city to the end of the Byzantine empire. The Turks took possession of it in the 11th century, and in the 14th it was almost entirely destroyed by Tamerlane.

SAREE, or SARI, a city of Persia, capital of the province of Mazanderan, situated in lat. 36° 30' N., long. 53° 10' E., 18 m. from the S. shore of the Caspian sea; pop. about 85,000. It is surrounded by a dilapidated wall and ditch, has dirty unpaved streets, and contains many houses of burnt brick neatly tiled, several mosques and Parsee temples, a remarkable brick tower 100 feet high with a conical roof, public baths, and 5 colleges. Some trade is carried on, in the produce of the country, with Astrakhan and the interior of Persia.

SARGENT. I. LUCIUS MANLIUS, an American author, born in Boston, Mass., June 25, 1786. He was educated at Harvard college, and afterward studied law under Samuel Dexter, but has never practised the profession. In 1813 he published "Hubert and Ellen, with other Poems." He became warmly interested in the temperance movement, in behalf of which he has written 3 volumes of "Temperance

Tales." He communicated a series of satirical and antiquarian sketches, entitled "Dealings with the Dead, by a Sexton of the Old School" (since republished in a volume), to the "Boston Transcript," to which he is still a contributor.

II. JOHN OSBORNE, an American journalist and lawyer, a kinsman of the preceding, born in Gloucester, Mass., in 1810. He was graduated at Harvard college in 1830, studied law in Boston, was admitted to the bar, and soon afterward became connected with the Boston "Atlas" as a political writer. He was elected to the lower house of the Massachusetts legislature in 1835 and 1836, and in 1837 became associate editor of the New York "Courier and Enquirer." Withdrawing from journalism after the election of President Harrison, he practised law in New York until 1848, when he took charge of the "Battery," a campaign paper at Washington established to support the claims of Gen. Taylor to the presidency. After the inauguration he founded at Washington with Mr. A. C. Bullitt the "Republic" newspaper, in which he supported the compromise measures, the opposition to which on the part of some of the members of the cabinet finally led to his retirement from the journal. He resumed it on the accession of President Fillmore, and conducted it on the principle of hostility to both the abolition and secession parties until it was discontinued at the close of that administration. Mr. Sargent continued to reside at Washington, practising his profession in the supreme court and in the court of claims, till the latter was in effect extinguished as a judicial tribunal by the determination of congress to revise its decisions in their committees of claims. He then returned to New York, where he now resides. In 1844 he published a pamphlet (reprinted in England, and translated into various languages) on improvements in naval warfare, with a biographical sketch of Capt. Ericsson and a notice of his inventions.

III. ESES, an American author and journalist, brother of the preceding, born in Gloucester, Mass., Sept. 27, 1812. While a school boy in Boston his father took him on a visit to Europe, and in St. Petersburg he attracted the notice of the banker Baron Stieglitz, who offered to give him a mercantile education as the companion of his son. He preferred however to return home, and entered Harvard college, where he remained two or three years, part of the time assisting the late S. G. Goodrich in his various publications. He then became connected with the "Boston Daily Advertiser," and afterward with the Boston "Atlas," and about 1839 removed to New York to take charge of the "Mirror." Returning to his native state, he fixed his residence at Roxbury, and edited for a few years the Boston "Evening Transcript," but finally retired from journalism to prepare a series of educational works, including several highly popular "Speakers" and "Readers." He has written for Miss Josephine Clifton a five-act play called "The Bride of Genoa" (1836), and for Miss Ellen Tree

the tragedy of "Velasco" (1837), both produced in Boston; "Change makes Change," a comedy, first played in New York; and "The Priestess," a tragedy founded on the story of Norma. He also began and edited for some time the "Modern Standard Drama." Beside two stories for the young entitled "Wealth and Worth" and "What's to be Done?" and other works of an unambitious character, he has written lives of Franklin, Campbell, Collins, Goldsmith, Gray, Hood, and Rogers, prefixed to editions of their writings; a "Life of Henry Clay" (1840), afterward edited with additions by Horace Greeley; "Songs of the Sea, and other Poems" (Boston, 1847); "Arctic Adventures by Sea and Land" (1857); and a volume of "Original Dialogues" for schools and families (New York, 1860). He has also contributed largely to magazines, and published several unacknowledged novels.

SARMATIA, in Roman geography, the name of a vast region of eastern Europe and western Asia (according to ancient divisions), extending from the Vistula and the Sarmatian mountains (the N. W. Carpathians) to the Rha (Volga) on the E., and from the Sarmatian sea (Baltic) on the N. to the Ister (Danube), Tibiscus (Theiss), and Tyras (Dniester), the Euxine (Black sea), Palus Mæotis (sea of Azof), and the Caucasus on the S., not including, however, the Tauric Chersonesus (Crimea). It thus comprised the most considerable parts of the former kingdom of Poland, including the Lithuanian provinces, the whole of central and southern Russia in Europe, except the Crimea, and northern Hungary. It was bordered by Germany, Pannonia, Dacia, the Tauric Chersonesus, Colchis, Iberia (with which it was connected by the central pass of the Caucasus, called the Sarmatian gates), Albania, Scythia, and the unknown regions of northern Europe. It was divided by the Tanais (Don) into European and Asiatic Sarmatia. The latter or eastern part was inhabited by the Sarmatæ or Sarmatians proper, probably the Sauromatæ of Herodotus, according to him an Asiatic people derived from the intercourse of Scythians with the Amazons. The larger western division, corresponding to the Scythia of Herodotus, was peopled by the Venedi, Alani, Hamaxobii, Roxolani, Jazyges, and numerous other tribes of various race. The modern Slavi are generally regarded as descendants of Sarmatian tribes.

SARPI, PAOLO, commonly known as Fra Paolo, an Italian monk, historian, and philosopher, born in Venice in 1552, died there, Jan. 14, 1623. At 14 years of age he entered a convent of Servites, exchanging his baptismal name of Pietro for Paolo. He there applied himself to mathematical and metaphysical studies, made many physical discoveries, and corresponded with many learned men. The inclination of the magnetic needle, the dilatation and contraction of the pupil of the eye, and the valves of the blood vessels are included among his discoveries. At 26 years of age he was provincial of his order, and at a later period pro-

curator-general. But his attachment to secular studies and his bold and free spirit brought him under suspicion of heresy; he was accused by the inquisition, and forced to retire to his native city. Chosen counsellor of Venice in its dispute with Pope Paul V. concerning the rights of the secular and ecclesiastical powers, he brought to the contest all his energy, subtlety, sarcasm, learning, and personal influence; and the contest was narrowed for a time to a passage at arms between the friar and the pope. Professing firm faith in the Catholic doctrine, he yet denied the infallibility of the papacy, and separated in his reasoning the powers of the pope from the powers of the church. He was denounced as a schismatic and a Protestant, attempts were made upon his life, and it was only in the seclusion of his convent that he thought himself safe. His pen still continued busy in sustaining popular resistance to the pope and his interdicts. To later ages he is better known by his history of the council of Trent, one of the most remarkable works in religious literature, for its immense research, brilliant style, and completeness of treatment. It was first published in London in 1619 under the feigned name of Pietro Soave Polano, passed through many editions, and was translated into Latin and the leading tongues of Europe. To counteract its influence a rival history of the council was undertaken by Cardinal Pallavicini, to whom all the archives of the church were freely opened. Another principal work of Sarpi was his special history of the controversy between Pope Paul V. and the republic of Venice, in which there is the same force of language, ingenuity of pleading, and partiality in the use of materials which mark his history of the council of Trent. The best complete edition of his writings was published in Naples (24 vols., 1789). His life has been written by the Italian liberal, A. A. Bianchi-Giovini (2 vols., Zürich, 1836). An account of the controversy of Sarpi with the pope and the Jesuits is given by T. Adolphus Trollope, in his "Paul the Pope and Paul the Friar" (London, 1861).

SARPY, an E. co. of Nebraska, bounded E. by the Missouri, and S. and W. by the Platte river; area, about 500 sq. m.; pop. in 1860, 1,201. Capital, Bellevue.

SARRACENIA, a genus of plants found in the bogs of North America, and so named by Tournefort in honor of a Dr. Sarrazin of Quebec, who many years ago sent one species and a description of it to Europe. The leaves of the sarracenias are either trumpet-shaped or pitcher-shaped, and they are called pitcher plants, forefathers' cup, huntsman's cup, or trumpets. The natural order *sarraceniaceæ* comprises 3 genera, one belonging to California, another to the eastern side of the Alleghanies, and the third to Guiana. The *sarraceniaceæ* are perennials, having fibrous roots, the leaves all radical, their petioles curiously expanded and uniting at their edges into a hol-

low urn, surmounted at the apex by the leaf blade, which is either erect or else hangs down in the form of a lid. The scapes or flower stalks generally bear each a single large flower; the calyx is 4 to 6 leaved, much imbricated, destitute of a corolla, or else consisting of 5 persistent sepals, often having an involucre on the outside, and 5 hypogynous, unguiculated, concave petals; the stamens hypogynous, with oblong, adnate, 2-celled anthers, bursting internally and longitudinally; the ovary free, 3 to 5 celled; the style simple, truncate, or expanded into a broad peltate plate, with 5 stigmatic angles; the capsule 2 to 5 celled; seeds very numerous, minute; albumen abundant.—The purple sarracenia, more commonly known as the side-saddle flower (*S. purpurea*, Linn.), is to be found in cold peat bogs and near the mossy margins of ponds, extending from New England to Wisconsin and southward on the E. slopes of the Alleghanies. It is a handsome plant at any season, and especially so when in blossom. Its leaves are numerous, curving upward from the root, pitcher-shaped, broadly winged, veined with purple lines, the lid round, heart-shaped, erect, its inner face bristly. When deeply sunk in the moss these leaves are seldom found destitute of water, and frequently contain drowned insects. From the centre of the leaves the flowers rise, each borne upon a tall, smooth, and cylindrical scape; the calyx consists of 5 ovate, obtuse, shining leaves, of a brownish purple color having 3 paler colored bracts; the petals are 5, panduriform, obtuse, hanging over the stigma like the flaps of a saddle, of a rich purple or crimson above, but paler beneath; the stamens are numerous and yellow, and surround the short pistil, whose stigma is broad, large, and very conspicuous. A variety of this species sometimes occurs having yellowish green flowers and paler veinless leaves, known as the *heterophylla* or diverse-leaved. A few other and southern species may be cited, such as the parrot-beaked pitcher plant (*S. psittacina*, Mx.), having short, spreading leaves, their tube slender, broadly winged, marked with white spots, and reticulated with purple veins, the lid almost closing the orifice; the flower purple, and appearing in April and May. It is found in the pine barren swamps of Florida and Georgia. The leaves of Drummond's pitcher plant (*S. Drummondii*, Croom) are 2 feet long, erect, trumpet-shaped, narrowly winged, the upper portion white and variegated with purple lines; the flowers are 3 inches wide. It is a highly conspicuous plant in southern pine barren swamps, appearing in blossom in April. The trumpet leaf (*S. flava*, Linn.) has yellowish leaves 2 feet long, which are large, erect, trumpet-shaped, narrowly winged, the lid yellow, erect, orbicular, slender-pointed, tomentose within, reddish at the base, and reticulated with purple veins; the flowers yellow, 4 to 5 inches wide, expanding in April and May. The plant is found in the low pine barrens from Florida to North Carolina and

westward. There are other species, all readily susceptible of cultivation in pots or boxes of cold moss or peaty soil well supplied with water. They have no economical or medicinal uses.

**SARSAPARILLA**, the common name of herbaceous plants or under shrubs of the genus *smilax*, the type of the natural order *smilacææ*. They have a tendency to climb; some have fleshy tubers, the leaves reticulated, the flowers bisexual or polygamous, calyx and corolla both alike, free, 6-parted; stamens 6, seldom hypogynous; pistil with a 3-celled ovary and a trifid style; fruit a berry. The species occur especially in the temperate and tropical parts of Asia and America. There are several species of *smilax* which are used for sarsaparilla in commerce, though Dr. Hancock, a writer on the productions of Guiana, affirms that there is but one which yields the genuine. Dr. Lindley ("Medical and Economical Botany," London, 1856) gives 5 species of *smilax* which afford this drug, viz.: the Vera Cruz sarsaparilla (*S. medica*, Schlechtendal), having prickly angular stems, papery, cordate, auriculate, 5-ribbed, somewhat fiddle-formed leaves, and about 12-flowered umbels, growing on the uplands of Mexico; the Brazilian (*S. siphilitica*, Humboldt), with a slightly prickly round stem, leathery, oblong-lanceolate, acuminate, 3-ribbed leaves, growing in the woods of tropical America; the Jamaica (*S. officinalis*, Kunth), with a prickly angular stem, leathery, oblong acute, cordate, 5 to 7-ribbed leaves, growing on the banks of the Magdalena river; the Italian (*S. aspera*, Linn.), with a prickly angular stem, cordate, sometimes hastate leaves, about 7-ribbed, leathery and prickly at the edge, found in the south of Europe, and of a decidedly inferior quality; and the China root (*S. China*, Linn.), with a round prickly stem, thin, roundish, oblong acute, about 5-ribbed leaves, and a tuberose rhizome or root stock, sometimes eaten as food on account of its abounding in starch. A species from New Holland (*S. glycyphylla*), called sweet tea, has been found to possess excellent qualities. A species found in the southern portions of North America, the false China root (*S. pseudo-China*, Linn.), according to Elliott, has a creeping, nodose, tuberous root, which is similarly employed as an alterative. In the woodlands of the northern states the wild sarsaparilla (*aralia nudicaulis*, Linn.), of the ginseng family or *araliaceæ*, furnishes in the long, creeping, horizontal, and aromatic roots a popular substitute for the foreign and genuine article.—The value of sarsaparilla in medicine is a subject of much dispute, many practitioners considering it highly useful in a variety of cases, and others thinking it nearly worthless.

**SARTHE**, a N. W. department of France, formed from the old province of Maine-et-Perche, bounded N. by Orne, E. by Eure-et-Loir and Loir-et-Cher, S. by Indre-et-Loire and Maine-et-Loire, and W. by Mayenne; area, 2,395 sq. m.; pop. in 1856, 467,193. The only

navigable rivers are the Loir and Sarthe, but the country is well watered by numerous smaller streams. There are mines of iron and anthracite. Capital, Le Mans.

**SARTO**, **ANDREA DEL**. See **ANDREA DEL SARTO**.

**SARTORIUS**, **ERNST WILHELM CHRISTIAN**, a German theologian, born in Darmstadt, May 10, 1797, died at Königsberg, June 13, 1859. He studied theology at the university of Göttingen, and became professor of theology at Marburg in 1821, and of dogmatic theology and ethics at Dorpat in 1824, with the honorary title of Russian aulic councillor. Thence he was called to Königsberg as superintendent-general of the province of East Prussia. He early embraced the views of the strictly orthodox old Lutheran party, and remained throughout his life one of its prominent advocates. He was a very prolific writer, and on account of a peculiar suavity in his style he has been called the John of the high Lutherans.

**SARTORIUS**, **GEORG FRIEDRICH CHRISTOPH**, baron von Waltershausen, a German historian, born in Cassel, Aug. 25, 1765, died Aug. 24, 1828. He studied at Göttingen, first theology, and afterward the historical sciences, and in 1766 was appointed assistant librarian, and in 1794 chief librarian of the university. He was appointed tutor in 1792, extraordinary professor of philosophy in 1797, and ordinary professor in 1802, and in 1814 professor of politics. By his lectures and writings he greatly advanced the study of political economy throughout Germany. In 1814 the duke of Weimar sent him to the congress of Vienna, but he remained there only until the beginning of the year 1815, having been elected a member of the legislature of Hanover. In the proceedings of the legislature he took an active part until 1817, when he resigned in order to devote himself to his professional duties. In 1827 he was ennobled by the king of Bavaria. He wrote a history of the Hanseatic league, an essay on the rule of the Ostrogoths in Italy, and other historical works, beside several works on political economy.

**SARUM**, **OLD**, an extinct city and parliamentary borough of Wiltshire, England, 2 m. N. from Salisbury, noted in the history of the parliamentary reform movement. It was a place of importance under the Saxons, and was made a bishop's see in the 11th century; but the cathedral having been removed to the present site of Salisbury in the reign of Henry III., in consequence of a local quarrel, the place was deserted, and has not now a single habitation, a few traces of its walls, castle, and cathedral alone remaining. Having, however, been endowed by Edward III. with the privilege of sending two members to the house of commons, the franchise accompanied the estate, and the proprietor, after it had lost all its inhabitants, continued to exercise this privilege and to return the two members regularly until the passing of the reform act in 1832.

**SASKATCHEWAN RIVER.** See HUDSON'S BAY TERRITORY, vol. ix. p. 324.

**SASNETT, WILLIAM J., D.D.,** an American clergyman and author, born in Hancock co., Ga., April 29, 1820. He was graduated at Oglethorpe university, Georgia, in 1839, studied law, and afterward joined the Alabama conference of the Methodist Episcopal church, in which he received his first itinerant appointments. In 1849 he was elected professor of English literature in Emory college, Ga., in 1858 president of Lagrange female college, and in 1859 of the East Alabama male college, at Auburn. He has published a work on "Progress" (1855), and a volume of "Discussions in Literature and Religion" (1850).

**SASSAFRAS** (*laurus sassafras*, Linn.; *sassafras officinale*, Nees), a small, hardy, and handsome tree of the natural order *lauraceæ* or the laurel family, found in rich woods from Canada to Louisiana. Its popular name is of Spanish origin. The trunk of the sassafras tree is 15 to 50 feet high; when old it is covered with a reddish gray bark, deeply and irregularly cracked so as to show the annual layers on the sides of its fissures, and of a dark cinnamon hue next to the wood. The branches are numerous, bare and crooked, the younger only being clothed with rich and pleasant green leaves of great variety of forms, and which turn to a buff or yellow color in autumn. Each leaf is supported on a footstalk of about  $\frac{1}{2}$  its length, is acute or wedge-shaped at its base, often entire, sometimes oval with an imperfect lobe, or more frequently dilated and 3-lobed. The flowers are in clustered and hanging racemes just below the leaves and around the base of the recent shoots; the sterile ones consist of a cup of 6 yellowish, oblong, petal-like parts, surrounding a circle of 6 stamens which encloses 3 other stamens; the fertile have only 6 imperfect stamens in a single circle, the pistil consisting of a roundish ovary, a short style, and stigma; the fruit is an oval berry-like drupe, of a rich dark blue when ripe, and borne on a dark red, thickened, club-shaped peduncle, both contrasting finely with the foliage; it is eagerly sought for by birds, though of a nauseous aromatic flavor. The caterpillars of several beautiful moths and butterflies feed upon the leaves.—The value of the sassafras tree is now chiefly for ornament, being much cultivated for the purpose, especially in England, and raised from the seed or from suckers and offsets of the roots. Formerly it was in high repute in medicine, and its roots, according to Gosnold, formed a part of the first cargo exported from Massachusetts, commanding extravagant prices. Its bark and wood are stimulant and diaphoretic, and are used in rheumatism and venereal diseases. The dried leaves, which contain mucilage, are mixed with soups; the young twigs and the root bark, which are strongly aromatic, are among the articles employed in making domestic beer. The wood is brittle, soft, and close-grained, and

sometimes employed for drawers and chests, retaining its pleasant odor for a long time; as a fuel it is not considered valuable, snapping in the fire like chestnut. The tree is seldom seen in cultivation, though deserving the care of the arboriculturist.

**SASSANIDÆ**, a dynasty of Persian kings, founded by Ardeschir Babeghan, or Artaxerxes IV., the grandson of Sassan, who overthrew the rule of the Arsacidæ, about A. D. 226. The period of this dynasty is a brilliant one in Persian history. Under the Sassanian kings, and especially under Sapor I., Sapor II., Chosroes I., and Chosroes II., long and successful wars were carried on against the Roman and Byzantine emperors, the Persian empire was extended and consolidated, and the Magian religion was restored and maintained. The dynasty closed with Yezdegird III., who in 641 was beaten by the caliph Omar in the great battle of Nahavand, into which the Persians went 150,000 strong; he afterward fled from place to place, and in 651 was murdered by a miller in whose mill he had hidden.

**SASSOFERRATO** (GIOVANNI BATTISTA SALVI), an Italian painter, born in the castle of Sassoferrato, near Urbino, about the commencement of the 17th century, died in Rome in 1685. Of his biography little is known, and he is frequently confounded with an earlier artist of the same name, who imitated Raphael. In style he followed the Carracci and their school, with a sweetness and delicacy of execution peculiar to himself. He painted landscapes, sacred portraits, particularly of the Madonna, and more rarely historical pieces. In the last named department his chief production is an altarpiece in the church of Montefiascone representing the death of St. Joseph. The Berlin museum contains many of his best pictures.

**SATAN.** See DEVIL.

**SATELLITE.** See ASTRONOMY.

**SATIN**, a closely woven glossy silk, originally imported from China. The uniformly smooth surface by which it is distinguished is obtained by the use of a loom with at least 5-leaved heddles and as many corresponding treadles. Four move up and down together, carrying as many yarns of the warp, across which the weft is thrown by the shuttle. The glossy or right side comes at the bottom from the shuttle being always thrown when  $\frac{2}{3}$  of the warp yarn is beneath to sustain it. By using very fine silk yarns of any color for the warp, and a heavier black yarn for the woof, the right side will present only the colored yarn, and the other will be a black surface upon which the crossing of the minute warp yarns is not visible.

**SATIN BOWER BIRD**, a conirostral bird of the starling family, and genus *ptilonorhynchus* (Kuhl). The bill is moderate, compressed, arched, and notched at the tip; the nostrils lateral, deeply sunk, with large opening partly concealed by projecting plumes; wings long and pointed, the 1st 3 quills graduated, and the

4th and 5th equal and longest; tail short and even; tarsi much longer than middle toe, robust and scaled; all 4 toes long and strong, with sharp claws. Two species are described by Gray, peculiar to Australia, found chiefly in forests bordering the larger rivers, and in thick brush of cedar; when perched on lofty trees they utter loud and harsh notes, somewhat resembling those of a domestic cat; they congregate in autumn in small flocks on the ground. The satin bower bird (*P. holosericeus*, Kuhl) is about the size of a jackdaw or small crow; in the adult male the plumage is deep, satiny, blue black, the primaries velvety black, and the wings and tail of the last color, edged with blue black; eyes light blue, with red circle around the pupil; bill bluish horn-colored, yellowish at tip, and legs and feet yellowish white. The female is grayish green above, the wings and tail sulphur brown; yellowish below, each feather scaled with a dark brown border. The old males are more rarely seen than the females and young males, and the last do not get their glossy plumage till the 2d or 3d year. They feed on berries and fruits, especially wild figs and the native cherry, and they often attack the ripening crops of the settlers. The common name is derived from the singular habit which the females have of making very extraordinary bower-like structures, of various sizes, which are the most curious examples of bird architecture on record, displaying more ingenuity combined with taste than any other members of the class of birds. On the ground, generally under the shelter of trees in a retired place, they form a dome-shaped bower of sticks and twigs on a platform of the same; these are so interwoven that the tops of the twigs turn in and nearly meet at the top, the forks always pointing outward so as to offer no obstruction to the ingress and egress of the birds. But the most singular habit is the manner in which the bower is ornamented; they collect with great perseverance all kinds of brilliant and striking objects, such as the gaudy feathers of parrots, shells, skulls and bleached bones of small animals, bright stones, and such high-colored rags as they can find about the houses of the natives and settlers; these they place at or near the entrances, introducing feathers between the interstices in the most fantastic and often in a very pleasing manner; so prone are these birds to pick up any odd-looking thing, that the natives always search their bowers, sure of finding many articles which they have missed from their scanty possessions. These bowers, according to Mr. Gould, are not used as nests, but probably as assembly rooms, where many individuals of both sexes sport in the most playful manner; they are probably also used as places of rendezvous during pairing time, and for the elegancies and amusements rather than the necessities of bird life. This species is the *cowry* of the natives, and is found chiefly, if not only, in New South Wales; the male has a loud liquid

call, beside the harsh note common to both sexes. The green satin bird (*B. Smithii*, Vig. and Horsf.) is rather smaller; the general color is a parrot green, with the ends of the wing coverts, secondaries, and most of the tail feathers tipped with white, and below with oval spots of the same. The food and the habitat are the same as in the last species, but it has not been ascertained that it makes a bower; it is called cat bird by the colonists, from the resemblance of its notes to the nightly concerts of the domestic cat.—The genus *chlamydera* (Gould) differs in having the nostrils exposed, a long and slightly rounded tail, and the 3d and 4th quills equal and longest. They are very shy birds, frequenting the forests and brush of Australia; the food consists of fruits and seeds. They make still more remarkable bowers than the preceding genus, and the structures are longer and more avenue-like, made externally of interwoven twigs, and lined with tall grasses meeting above; they are decorated with bivalve shells, stones, small skulls, and whitened bones, the stones being arranged as a pavement, and so as to keep the grasses in place. The spotted bower bird (*C. maculata*, Gould) is about 11 inches long, the general color above being deep brown, each feather tipped with buff and edged with black on the head; the back of the neck is crossed by a broad frill of rosy pink elongated feathers; the lower parts grayish white; both sexes have the frill, except when young. In some of the larger bowers made by this bird, which had evidently been used for years, Mr. Gould has seen nearly half a bushel of shells and pebbles at each entrance, which had been brought from the shore at a considerable distance. The great bower bird (*C. nuchalis*, Gould) is about 15 inches long, and occurs in N. W. Australia; it is grayish brown above, satiny on the head, tipped with grayish white; on the nape a rosy pink frill partly encircled with a ruff of satiny plumes; yellowish gray below, tinged with brown; it makes highly ornamented bowers. For figures, and details on all these species, see Gould's "Birds of Australia," vol. iv., Nos. 8, 9, 10, 11 (fol., London, 1848).

SATIN SPAR, a name sometimes given to a fibrous variety of gypsum, which has a satin lustre, and is susceptible of a high polish. It is also applied to a variety of calcareous spar which exhibits similar features.

SATIN WOOD, an ornamental wood obtained from different trees in the East and West Indies and in South America, having when polished a high lustre like that of satin, and soft pleasing colors. That of Guiana is white and reddish, and is the product of the *Ferolia* and *Guianensis* (Aublet). The satin wood of Ceylon is obtained from the *chloroxylon Swietenia*. The best variety is imported from St. Domingo in logs or in planks of 9 to 20 inches width. That from Singapore and Bombay is next in quality; the poorest sort is from New Providence, and is used chiefly for brushes. The

wood is close, resembles boxwood in color, but is more orange, and is sometimes beautifully mottled and curled. Several years ago satin wood was much used for internal decoration and furniture; but at present it is rarely seen excepting for workboxes, brushes, &c.

**SATRAP**, in ancient Persia, the governor of a province. The duties of the satraps were originally altogether civil, the governors of garrisons and military commanders being independent of them, and both classes being appointed by and directly responsible to the king. Gradually, however, both the civil and military power in the provinces came to be confided to the satraps, especially if they were of royal blood, as in the case of the younger Cyrus. The more powerful of them being thus enabled when so disposed to defy the royal authority, frequent revolts occurred, and many made themselves independent.

**SATTARA**, a province of British India, in the Bombay presidency, bordering on the Indian ocean, between lat. 16° 22' and 18° 32' N., and long. 73° 24' and 76° 25' E.; area, 11,000 sq. m.; pop. 1,320,000. Capital, Sattara. The river Kistnah has its source in the upper part of Sattara, and in its S. E. course through the centre of the province receives many tributaries. The country forms part of the table land of the Deccan, and the surface is generally much broken and rugged. The Ghauts extend along the W. boundary. The soil is generally barren, and in the W. or more elevated part of the country the climate is cool and excessively moist. The people are nearly all of the Mahratta race. Shevaje, the famous Mahratta chief, founded the kingdom of Sattara about the middle of the 17th century; and in 1749 one of his successors resigned the position of head of the Mahrattas to an officer of his court, called the peishwa, who transferred the seat of government from Sattara to Poona. The war of 1817-18 left the whole of the peishwa's territory in the hands of the British, who released the rajah and restored him to the throne of his ancestors, under British protection. In consequence of certain intrigues, he was deposed by his protectors in 1839, and his brother elevated in his place. The new rajah governed with great wisdom, and died in 1848 without issue, but adopted a boy distantly related to him a few hours before his death. It was decided by the British authorities that a dependent principality could not pass to an adopted heir without the consent of the paramount power; and Sattara was annexed to British India.

**SATURDAY** (Saturn's day), the 7th and last day of the week, and the Roman *dies Saturni*. It is the Jewish sabbath, and in the Roman Catholic breviary is still called *dies sabbati*.

**SATURN** (**SATURNUS**), an ancient mythical king or deity of Italy, to whom was ascribed the introduction of agriculture and civilization. According to the tradition of the aborigines, he reigned on the Capitoline hill, and after his death was translated to the abodes of the gods.

He emancipated the inhabitants from their savage life, and taught them the arts of peace, whence his reign was called the golden age of Italy. With his wife, Ops, the representative of plenty, he was regarded as the protector of agriculture and of all vegetation which tended to the benefit of man, and carried in his hand a crooked pruning knife. The Greek deity Cronos, with whom he was frequently identified, was the youngest son of Heaven and Earth, and the father of Jupiter, Juno, Neptune, and Pluto. He usurped the sovereignty of Heaven (*Uranus*), and instituted a reign of peace and plenty, called by the poets the golden age, to which succeeded the rule of Jupiter, who deposed and imprisoned his father. His name literally signifies time, and in the character of the destroyer he was represented as bearing a sickle or scythe, and as devouring his own offspring.

**SATURN**, **THE PLANET**. See **ASTRONOMY**.

**SATURNALIA**, the festival of Saturn, celebrated originally by the rural population of ancient Italy in December, as a sort of harvest home, and in later ages converted into a season of almost absolute relaxation and merry making. Its origin extends into mythical times, and was ascribed to Janus, Hercules, and others. Tullus Hostilius is said to have instituted or rather revived games of the Saturnalia and Opalia at Rome, in honor of Saturn and Ops, to commemorate a victory over the Sabines; and thenceforth probably the festival took its place permanently in the Roman calendar. During the republic a single day in the middle of December was set apart for its celebration, although the whole month was considered as dedicated to Saturn; but under the emperor Augustus the term was made to embrace 8 days, Dec. 17, 18, and 19, to which a 4th day, and under Caligula a 5th, was added. It would seem, however, that under the emperors the festivities in reality lasted 7 days, and included 3 separate festivals, the Saturnalia proper, the Opalia, and the Sigillaria, so called from the little earthenware figures given to children as presents. During the Saturnalia no business of any kind was transacted, the distinctions of rank were forgotten, the utmost freedom of speech was permitted, and crowds perambulated the streets, wearing the *pileus*, the emblem of liberty, and shouting *Io Saturnalia*, much in the same spirit as in the modern carnival time; while within doors, feasting and revelry were indulged to an inordinate degree.

**SATYR**, in Greek mythology, a species of rustic divinity or supernatural creature, under the government of the god Bacchus, and forming part of his retinue. Satyrs are represented as robust and rough in appearance, with the heads and bodies of men and sometimes the lower parts of goats. Their ears were pointed like those of animals, and they had short horns and tails. In character they were frolicsome and addicted to various kinds of sensual enjoyments. They are sometimes confounded by the Latin poets with the Italian fauns, although ori-



ginally distinct beings, and in ancient pictures and bass-reliefs so represented. One of the most celebrated statues of antiquity was the satyr of Praxiteles at Athens.

SAUK, a S. W. co. of Wisconsin, drained by the Barraboo river; area, 985 sq. m.; pop. in 1850, 4,371; in 1860, 18,894. The surface is hilly and well timbered, and the soil fertile. The Milwaukee and La Crosse railroad passes through the county. Capital, Barraboo.

SAUL (Heb. *Shaul*), the first king of Israel, son of Kish, of the tribe of Benjamin. He had 4, or according to some 6 sons, 3 of whom, including Jonathan, the intimate friend of David, fell with their father in the battle against the Philistines at Mount Gilboa, and one of whom, Ishbosheth, for two years after his father's death maintained himself as king of all the tribes except Judah. He had also two daughters, Merab, the first born, and Michal, the wife of David. (For the history of his reign, see *HEBREWS*, vol. ix. p. 39.)

SAULCY, LOUIS FÉLICIEN JOSEPH CAIGNART DE, a French antiquary and numismatist, born in Lille, March 19, 1807. He was a pupil of the polytechnic school, became an officer of artillery, and devoted his leisure hours to numismatics and antiquities. In 1836 the French institute awarded him a prize for his *Essai de classification des suites monétaires Byzantines*; and in 1839 the academy of inscriptions elected him a corresponding member. He had meanwhile been appointed professor of mechanics in a military school at Metz; whence, through the influence of the duke of Orleans, he was called to the post of keeper of the museum of artillery in Paris. In 1842 he became a resident member of the academy of inscriptions. He studied in succession the Celtiberian, Phœnician, Egyptian, and cuneiform inscriptions; and in 1850, sailing for Palestine in company with his son and M. Édouard Delessert, he explored the Dead sea and the surrounding territory. On his return to France he announced that he had found the ruins of Sodom and the other cities that were thought to have been submerged under the Dead sea, and that he had identified the "tombs of the kings" at Jerusalem as actually the royal sepulchres of Judah; and as an evidence of this, he brought for the Louvre a sarcophagus which possibly belonged to one of the race. These assertions gave rise to animated discussions, in which De Saulcy's opinions were very severely criticized. His *Voyage autour de la Mer Morte et dans les terres bibliques* was published in Paris in 1852-'4 (2 vols. 4to., with maps and drawings). Since then he has resumed his numismatic pursuits, and beside contributions on this subject to the *Mémoires* of the academy of sciences and various periodicals, he has published *Études sur la numismatique Judaique*, and also a *Histoire de l'art Judaique, tirée des textes sacrés et profanes* (Paris, 1858).

SAULT STE. MARIE. See SAINT MARY'S STRAIT.

SAUMAISE. See SALMASIUS.

SAUMAREZ, or SAUSMAREZ, JAMES DE, baron, an English admiral, born in St. Peter Port, Guernsey, March 11, 1757, died in Guernsey, Oct. 9, 1836. At the age of 13 he entered the navy, and in 1776, for his share in the attack on Charleston under Sir Peter Parker, was made lieutenant. He served in America during the following 4 years, was raised to the rank of commander for his conduct in the engagement between the English and Dutch fleet on Aug. 5, 1781, and as captain of the Russell, a ship of the line, under Lord Rodney, gained great honor in the engagement between the English and French fleets on April 12, 1782. In 1793 he was knighted for the capture of a French frigate. In November of the same year, while in command of a small squadron, he was attacked by a French force twice as large as his own, but maintained a running fight and succeeded in saving all his vessels. In March, 1795, he was appointed to the command of the Orion, 74, and was present at the battle of June 23, at the engagement off Cape St. Vincent, and in the battle of the Nile, in which last he was second in command, and was severely wounded. During the winter of 1799 and 1800 he commanded the squadron ordered to watch the French fleet in Brest. In 1801 he was created a baronet and rear admiral of the blue, and placed in command of a small squadron commissioned to watch the Spanish fleet at Cadiz. On July 6 he attacked the French vessels in the bay of Algeciras, but was worsted. In a subsequent engagement on July 10 he was more successful, the enemy losing 3 sail of the line, and 3,000 men killed or taken prisoners. For this service the admiral received the order of the bath, the thanks of both houses of parliament, and a pension of £1,200 in 1803. At the beginning of the war with Russia, he was appointed to the command of the Baltic fleet, and by his diplomatic as well as naval skill was largely instrumental in detaching that power from its alliance with France. In 1814 he was made full admiral, in 1819 rear admiral, and in 1821 vice admiral of Great Britain, and in 1824 was created port admiral of Plymouth, which post he held until 1827. In Sept. 1831, he was elevated to the peerage as Baron de Saumarez of Saumarez in the island of Guernsey, and thenceforth lived in retirement. His life has been written by Sir John Ross under the title of "Memoirs and Correspondence of Admiral Lord de Saumarez" (2 vols. 8vo., London, 1838).

SAUMUR, a town of France, in the department of Maine-et-Loire, situated on the left bank of the Loire, 25 m. S. S. E. from Angers; pop. in 1856, 13,073. It is built partly on a steep hill surmounted by an old castle now used as an arsenal, and partly on the low ground by the river, and is connected with a suburb on the opposite bank by a handsome bridge. The church of Notre Dame de Nantilly is said to have been originally erected in

the 6th century. The principal manufactures are linen, glass, enamelled articles, leather, and saltpetre; and some trade is carried on in farm produce. Saumur was early attached to the cause of the reformation, and became a stronghold of the Protestants.

SAUNDERS, PRINCE, attorney-general of Hayti, a negro, born in Thetford, Vt., about 1775, died in Hayti, Feb. 12, 1840. He was for some years a teacher of free colored schools in Colchester, Conn., and Boston, Mass. In 1807 he went to Hayti, where Christophe engaged him to improve the state of education in his dominions, and sent him to England to procure the necessary teachers, books, and school apparatus. While in that country he received much attention and mixed in the most aristocratic society owing to a ludicrous misapprehension of his Christian name for a title. On his return to Hayti, the result of his mission not being satisfactory to Christophe, Saunders left the island and returned to the United States, where he studied divinity, and preached for some time to a congregation in Philadelphia. After a few years he returned to Hayti, where he was received with great favor, and appointed attorney-general of the republic, which office he held till his death. He published several small works, including "Haytian Papers" (London, 1816).

SAUNDERSON, NICHOLAS, an English mathematician, born at Thurlston, Yorkshire, in 1682, died April 19, 1739. Before he was a year old he lost his sight by the small pox. He became acquainted with the Greek and Latin languages while young, and was instructed by his father in the rudiments of mathematics. At 18 he received instruction in algebra and geometry, and by the assistance of some friends was enabled to attend an academy near Sheffield. In 1707 he established himself as a teacher of mathematics and optics at Cambridge, and in 1711 Queen Anne, on the recommendation of Sir Isaac Newton, conferred upon him the degree of M.A. in order that he might be qualified to hold the Lucasian professorship of mathematics in Christ's college, to which he was thereupon appointed, as successor of Mr. Whiston. In 1728 he was created LL.D. by the special mandate of George II. He wrote "Elements of Algebra" and the "Method of Fluxions" (8vo., 1756), as well as a commentary (2 vols. 4to., London, 1740) on some parts of Newton's *Principia*. He invented a method of performing arithmetical operations solely by the sense of touch.

SAURIANS, an order of scaly reptiles, including such as are popularly called lizards, skinks, monitors, geckos, iguanas, agamas, chameleons, &c., and the extinct iguanodon, ichthyosaurus, pterodactyl, and plesiosaurus; the ophisaurians, like the blind worm and amphisbæna, have no limbs, and form the connecting links between lizards and serpents. The bones of the upper jaw and face are firmly attached to the cranium, and have no indepen-

dent motions as in snakes; the lower jaw, instead of having a loose articulation with the movable mastoid and tympanic bones, is firmly supported on a single point, allowing no dilatation of the opening of the mouth; the two branches are united at the symphysis immovably. Both jaws are armed with teeth, and in a few instances the palate; the teeth are conical and slightly hooked, sometimes compressed and serrated; they are attached to the surface of the jaw, or placed in a shallow groove, but are never implanted in separate sockets. The tongue has two very different forms; it is either long, slender, bifid, and sheathed, as in snakes (*fissilingua* or *leptoglossa*), or is thick and fleshy, without sheath (*brevilingua* or *pachyglossa*); in the former division are included the skinks, amphisbæna, common lizards, and monitors, and in the latter the geckos, iguanas, agamas, and chameleon. The eyes almost always have distinct movable lids, the ear is visible externally, the skin is covered with scales as in snakes, and the head is protected by shield-like plates; they have generally 4 well developed limbs; a sternum is present in all, to which some of the movable ribs are always attached, and its size is in relation to the development of the limbs. The body is elongated, rounded, with imbricated or granular scales; the tail is long and tapering, rarely prehensile, and generally covered with scales in whorls; the toes are furnished with claws; the head is united to the spine by a single condyle; the lips are not movable, and the male external reproductive organs are double. They are all air-breathers, and the two lungs are about equally developed; the young undergo no metamorphosis, and the eggs are covered by a hard skin or shell; a few are viviparous. (See LIZARD.) The anal aperture is transverse, and the dermal or external skeleton is not bony like that of the *loricata* or crocodilians; the older writers, and some of the modern, place the crocodilians among saurians. This order is very numerous in genera and species, distributed most abundantly in tropical regions, where they are largest and most active. In their movements they come near the mammals, among them being found those which creep, others which walk, or run, or climb, or swim, or dive, or burrow, or fly. Their important subdivisions are treated under the popular names.

SAURIN, JACQUES, a French Protestant clergyman, born in Nîmes, Jan. 6, 1677, died at the Hague, Dec. 30, 1730. He relinquished his studies at Geneva, whither his father had retired on the revocation of the edict of Nantes, for the profession of arms, and in 1694 made a campaign in the English service as a cadet under Lord Galway, and afterward served in Piedmont. After the duke of Savoy made peace with France, Saurin returned to Geneva and resumed the study of philosophy and theology. In 1700 he visited Holland, and in the next year went to England, where he became pastor of the Walloon church in London. He

spent there 4 years, after which he returned to Holland, and passed the rest of his life at the Hague, acquiring the reputation of the greatest preacher of the French Reformed church. His published writings comprise 12 volumes of sermons (6 volumes of which have been translated into English), and various treatises and discourses.

SAUSSURE. I. HORACE BÉNÉDICT DE, a Swiss geologist and naturalist, born in Geneva, Feb. 17, 1740, died there, Jan. 22, 1799. He was the son of Nicolas de Saussure, a writer on agriculture. At the age of 21 he was elected professor of physics and philosophy at the university of Geneva. His favorite pursuit at first was botany, and especially vegetable physiology; and in 1762 he published his *Observations sur l'écorce des feuilles et des pétales*. In 1768-'9 he visited Paris, explored the extinct volcanoes of Auvergne, and travelled through Belgium, Holland, and England. Subsequently he examined particularly Mounts Vesuvius and Etna, traversed the entire chain of the Alps 14 times by 8 different routes, and made 19 other excursions to central points of the chain; visited the mountains of England, Germany, Burgundy, and Dauphiné; in 1786 ascended the summit of Mont Blanc, where he remained for 3½ hours; in 1788 the Col du Géant, on which he encamped for 17 days; and in 1789 he reached the summit of Monte Rosa in the Pennine Alps. For facilitating his investigations, he invented the magnetometer, hygrometer, electrometer, cyanometer, diaphanometer, and anemometer. His observations were recorded with the utmost care and candor, and the knowledge thus obtained of the crust of the globe laid the foundations for a geological theory based on fact and not on speculation. The exact and vivid descriptions in his *Voyages dans les Alpes* (4 vols., 1779-'96) gave him the title of "the first painter of the Alps." He was chosen a member of the council of 200 in Geneva, and of the national assembly of France after the annexation of that city to France in 1798. He was the founder of the society of arts of Geneva, and its president till his death. Beside the works above named, he left a *Dissertatio Physica de Igne* (Geneva, 1759); *Essais sur l'hygrométrie* (1763); *Relation abrégée d'un voyage à la cime du Mont Blanc en Août 1787* (1787); and numerous dissertations and essays. II. NICOLAS THÉODORE DE, son of the preceding, born in Geneva, Oct. 14, 1767, died there in April, 1845, was professor of mineralogy and geology in the university of Geneva, and attained a high reputation for his investigations and discoveries in vegetable chemistry. III. ALBERTINE ADRIENNE NECKER DE, sister of the preceding, born in Geneva in 1766, died there, April 20, 1841, married Jacques Necker, professor of botany at the academy of Geneva, and nephew of the celebrated financier. She translated Schlegel's "Course of Dramatic Literature" (1814), and wrote *Notice sur le caractère et les écrits de Mme. de Staël* (8vo., Paris,

1820), and *L'éducation progressive, ou étude du cours de la vie* (3 vols. 8vo., Paris, 1828-'38), which received the Monthyon prize.

SAUVEUR, JOSEPH, a French mathematician, born at La Flèche, March 24, 1653, died in Paris, July 9, 1716. He was mute until the age of 7 years, and his voice and hearing always remained imperfect; yet he is chiefly celebrated for his researches in musical acoustics, of which he made a new science. He early had to struggle against adverse circumstances; but having gained an introduction at court through the friendship of Prince Eugene, to whom he had given lessons, and by the publication of a work on the probability of chances in various games, in 1680 he was appointed mathematical instructor of the pages of the dauphiness, in 1686 professor of mathematics at the college of France, and in 1703 examiner of engineers on the recommendation and as successor of Vauban, whose friendship he had secured by a work on fortification. Aided in his musical investigations by the most skilful practitioners, among other results he determined the number of vibrations corresponding to each determinate sound, whether of an organ pipe or of a sonorous cord; and he furnished to the *Mémoires* of the academy of sciences, of which he became a member in 1696, numerous papers on his discoveries and their practical applications. He was also the author of a universal and perpetual calendar, of the charts of the coasts of France forming the first volume of the *Néptune Français*, &c.

SAVAGE, RICHARD, an English poet, born in London, Jan. 10, 1697-'8, died in Bristol, Aug. 1, 1743. According to his own story, which has never obtained universal credence, he was the illegitimate offspring of Anne, countess of Macclesfield, and Richard Savage, Earl Rivers, and at the age of 14 months was consigned by his mother to the care of a poor woman, who brought him up in obscurity. The countess early disowned him, but her mother, Lady Mason, caused him to be placed in a school at St. Albans, after leaving which he was apprenticed to a shoemaker. Until his 17th year he bore the name of Smith; but hearing then by accident the secret of his birth, he assumed his father's name. All efforts to obtain recognition from his mother however proved unavailing, and throughout her life she manifested for him the utmost repugnance. The discovery of his parentage seems to have awakened in Savage, remarkable in his youth for quickness and enthusiasm, an ambition to rise above his humble employment; and, his story becoming known, influential friends appeared to assist him. Among others, Steele, Wilks the actor, and Mrs. Oldfield befriended him, and in 1728 he produced a successful tragedy, "Sir Thomas Overbury," in which he played the principal character, and which yielded him a profit of £200. The publication of a volume of miscellanies soon after increased his reputation; but his irritable and capricious

temper and fondness for low enjoyments continually interfered with his advancement. In 1727, having killed a man in a drunken brawl, he was tried and condemned to death. The countess of Hertford interceded with Queen Caroline in his behalf, and, despite the exertions of his mother to have the sentence carried into effect, on the ground that he had once attempted her own life, he received the royal pardon. Leaving prison with feelings exasperated to the highest pitch of resentment against his mother, he published his poem, "The Bastard," written under a bitter sense of wrong and full of energetic feeling and sarcasm. With a view of putting an end to the public scandal which he provoked, Lord Tyrconnel, a relative of his mother, soon afterward took him into his own house, where he was allowed an annual income of £200. For several years he led a life of pleasurable excitement, courted and caressed by men of genius and fashion; but having quarrelled with his protector, he was again cast adrift upon the world. By the death of Queen Caroline soon after he was deprived of a pension of £50, and left to the charity of his friends, whom he gradually alienated by his extravagance and arrogance. He was finally induced to retire to Swansea in Wales, and an annual stipend of £50 was contributed to his support by Pope and others. Wearying of the dullness of this place, he set off after the lapse of a year for London with a tragedy which he hoped to have produced. While passing through Bristol he was arrested for a debt of £8, and died in the debtors' prison of that place. In addition to the works mentioned, he wrote the "Wanderer" (1729), a poem esteemed by him as his masterpiece, and dedicated to Lord Tyrconnel, and a number of minor pieces. His melancholy career is the subject of one of the best of Johnson's "Lives of the Poets."

SAVANNAH, the largest city in Georgia, and capital of Chatham co., on the right bank of the Savannah river, 18 m. from its mouth, and 90 m. S. W. from Charleston, in lat. 32° 5' N., long. 81° 5' W.; pop. in 1850, 16,060; in 1860, 22,292. The city is built upon a sandy plain about 40 feet above the river, with one narrow street below the steep bluff, the warehouses upon which open below on the level of the piers, and from the uppermost story on the other side upon a wide sandy area called Bay street, which is divided by numerous carriage ways and rows of pride of India trees. The whole city is regularly laid out with broad streets, closely shaded by rows of these trees, and at many of the principal crossings are open squares with trees. The most noticeable public edifices are the city exchange, court house, state arsenal, barracks, artillery armory, theatre, St. Andrew's hall, the lyceum, Oglethorpe hall, Chatham academy, custom house, market house, hospitals, and asylums. The custom house is an imposing granite edifice, 110 feet long, 52 feet deep, and 52 feet in height, with the post office in the basement, customs rooms

on the second floor, and U. S. court rooms on the third floor. St. John's church is a fine building in the English Gothic style of architecture. Christ church is of the Grecian Ionic order. Several other churches are very handsome and commodious buildings. The Georgia historical society has a large and beautiful hall. The state bank building is considered the handsomest in the city; it is brick, of three stories, fronting Monument square. The reservoir for the distribution of water throughout the city is placed on a substantial circular tower 80 feet high. There are 45 charitable institutions, among which are the orphan asylum, Savannah hospital, Georgia infirmary, union society, widows' society, and seamen's friend society. There are 4 banks of discount and circulation, a savings bank, and a number of private banking houses. There are 1 monthly, 2 weekly, and 3 daily journals. A monument to the memory of Gen. Greene is erected in Johnson square, and one to the memory of Pulaski, on the spot where he fell in the attack on the city in 1779. Three railroads terminate in Savannah: the central to Macon, which connects by its branches with Augusta, and with the various roads of the N. portion of the state; the Savannah, Albany, and Gulf railroad, finished 107 m. S. W. toward the Florida line; and the Charleston and Savannah railroad. The city has 16 churches, viz.: 2 Baptist for whites and 3 for colored people, 2 Episcopal, 1 Presbyterian, 1 Independent Presbyterian, 1 Lutheran, 1 Methodist for whites and 1 for colored people, 1 Unitarian, 1 Roman Catholic, 1 mariners' chapel, and 1 Hebrew synagogue.—During the year ending June 30, 1860, the entrances were 196 vessels of 92,648 tons, and the clearances 276 vessels of 149,011 tons. Value of imports, \$782,061; of exports, \$18,351,554; registered and enrolled shipping of the port, 40,840 tons. The chief exports were cotton, rice, lumber, and naval stores. In 1859 37,797 casks of rice and 38,697,742 feet of lumber were exported. Before the civil war of 1861 steamers ran regularly to New York, Boston, Philadelphia, the West Indies, &c. Although the harbor is one of the best in the southern states, vessels drawing 14 feet of water can pass up to the city only at high water, and those of greater draught are detained 3 m. below. Much dredging also is required to keep the channel open in certain places to this extent. The mean rise and fall of the spring tides at the city is 7 feet 6 inches, and of neap tides 5 feet 5 inches. The river flows between marshy lands, which are intersected by numerous creeks and artificial channels, and are cultivated chiefly for rice. Long narrow islands and spits almost level with the water occupy a large portion of the space between the opposite banks, and reduce the main channel for a considerable part of the way between the city and the mouth to a width of a quarter of a mile and even less. From the city the distance across to Hutchinson's island, which extends up and down the river for about

6 m., is only about 600 feet. The chief defences of the river are Fort Pulaski, a strong fortification on Cockspur island, at the mouth of the river, built by the United States at a cost of \$988,859, and Fort Jackson on the right bank of the river, built at a cost of \$182,000. Against approaches by land the city is protected by the swampy alluviums and numerous creeks of the river bottoms, which are passable by a very few roads called causeways, and by the sandy plains which are more or less covered with groves of live oaks, the bay, and magnolia, and thickets of various evergreen trees, vines, and shrubs.—Savannah was founded in Feb. 1733, by Gen. Oglethorpe. The British attacked it March 3, 1776, and were repulsed; but on Dec. 29, 1778, they took possession of the city. In Oct. 1779, the French and American army under Count D'Estaing and Gen. Lincoln attempted to recapture it, but were unsuccessful. In this engagement Count Pulaski fell, and the French lost 537 in killed and wounded, and the Americans 241. Savannah received a city charter in Dec. 1789. In Nov. 1796, a fire destroyed property to the value of \$1,000,000; and in Jan. 1820, another conflagration occurred, involving a loss of \$4,000,000. On Jan. 8, 1861, two weeks prior to the passage of the ordinance of secession by the convention of Georgia, Forts Jackson and Pulaski were seized by the state troops by order of the governor.

SAVANNAH RIVER. See GEORGIA, vol. viii. p. 177.

SAVARY, ANNE JEAN MARIE RENÉ, duke of Rovigo, a French soldier, born at Marc, near Vouziers, now in the department of Ardennes, April 26, 1774, died in Paris, June 2, 1833. He was educated at the college of Metz, enlisted at the age of 15, served under Custine in the army of the north, and became captain at the age of 19. He then joined the army of the Moselle, commanded by Pichegru, and was afterward appointed on the staff of Gen. Desaix, whom he accompanied to Egypt, and saw mortally wounded at Marengo. He then became aide-de-camp to the first consul, who made him successively colonel, commander of the *gendarmerie d'élite*, brigadier-general, and director of the secret police (1802). He traced out the conspiracy of Cadoudal, and superintended the execution of the duke d'Enghien, when his conduct was so harsh as to excite severe animadversions. A few months later he received the rank of general of division, distinguished himself in 1805 at the battle of Austerlitz, and went to Russia on a secret mission. During the campaign of 1806 in Prussia, he first commanded two regiments of the imperial guard, and was then placed at the head of the 5th army corps. While protecting Warsaw against the Russians after the battle of Eylau, he gained a brilliant victory at Ostrolenka, Feb. 16, 1807, for which he received a pension of 20,000 francs; and for his services in the battles of Heilsberg and Friedland, he received from the emperor the title of duke of Rovigo.

After the peace of Tilsit, he was again sent on a mission to Russia. Being sent to Spain in 1808 to supersede Murat in the chief command there, he induced Charles IV. and his son Ferdinand to repair to Bayonne, where Napoleon was waiting for them. He accompanied his master to Erfurt, returned with him to the peninsula, and in 1810 was appointed minister of police in place of Fouché; but two years later he was taken unawares by the conspiracy of Mallet, arrested in his bed, and for several hours kept a prisoner at La Force. During the Hundred Days he was appointed peer of France and chief commander of the *gendarmerie*. After the battle of Waterloo he attempted to follow Napoleon on board the Bellerophon, but was arrested and sent by the English to Malta, whence he escaped to Smyrna. A sentence of death was passed upon him in France by default; but in 1819 he returned to Paris and procured a reversal of the sentence, and was restored to his military rank, but was not called into active service. In 1823, in order to refute a charge against him in Las Cases' *Mémoires de Ste. Hélène*, he published a pamphlet in which he attempted to throw the whole responsibility of the duke d'Enghien's death on Prince Talleyrand. Incurring thus the displeasure of the court, he went to Rome, where he lived until 1830. On Dec. 1, 1831, he was appointed by Louis Philippe governor of Algeria. Some strategical roads were constructed and the city of Bona was taken under his administration; but he evinced such cruelty to the natives and such a violent temper toward his subordinates that he was recalled in 1833. In 1828 he published his *Mémoires pour servir à l'histoire de l'empereur Napoléon* (8 vols. 8vo.).

SAVARY, NICOLAS, a French traveller and scholar, born in Vitré, Brittany, in 1750, died in Paris, Feb. 4, 1788. He went to Egypt in 1774, and after residing there 5 years travelled among the islands of the Grecian archipelago, and returned in 1781 to France, where he published a French translation of the Koran, with notes and a life of Mohammed (2 vols. 8vo., Paris, 1783), and an abstract of the same under the title of *Morale de Mahomet* (12mo., 1784). He also published *Lettres sur l'Égypte* (3 vols. 8vo., 1784-'5) and *Lettres sur la Grèce* (8vo., 1788), never completed; and he left a MS. *Grammaire de la langue Arabe vulgaire et littéraire*, which was revised and published by Langlès (4to., Paris, 1818).

SAVE (anc. *Savus*; Ger. *Sau*; Hun. *Száva*), a river of Austria and Turkey, rises in the Carnic Alps, in the N. W. corner of the province of Carniola, flows in a mostly E. S. E. direction through Carniola and Croatia, and along the southern boundary of the Military Frontier, which it separates from Bosnia and Servia, and empties into the Danube between Belgrade and Semlin. Its principal affluents, all from the south, are the Laybach, Unna, Verbas, Bosna, and Drina.

SAVIGNY, FRIEDRICH KARL VON, a German jurist, born in Frankfort-on-the-Main, Feb. 21, 1779, died in Berlin, Oct. 25, 1861. He studied at the university of Marburg, where as extraordinary professor he lectured on the civil law from 1801 to 1804. He then travelled for 4 years in France and Germany, in 1808 was appointed professor of law in the university of Landshut, in 1810 in that of Berlin, and in 1811 was elected a member of the Prussian academy of science. He was appointed a member of the council of state in 1817, and in 1842 minister of justice for the revision of the law, and in 1848 retired from political life. He is the author of several important works on jurisprudence, among which are: *Das Recht des Besitzes* (Marburg, 1803; translated into English under the title of "Treatise on Possession," &c., 6th ed., 8vo., London, 1848); *Geschichte des Römischen Rechts im Mittelalter* (6 vols., Heidelberg, 1815-'31); and *System des heutigen Römischen Rechts* (5 vols., Berlin, 1840-'49), to which *Das Obligationenrecht* (1851-'3) is an appendix.

SAVILLE, or SAVILLE, GEORGE, marquis of Halifax, an English statesman, born in 1630, died in April, 1695. He was the son of a Yorkshire baronet, and for his zeal in bringing about the restoration was created in 1668 Baron Savile and Viscount Halifax; in 1679 he was made earl, and in 1682 marquis of Halifax. During the early part of the reign of Charles II. he had distinguished himself in opposition to the court; but in 1672 he was made a privy councillor, and in the ministry formed by Temple after the fall of Danby in 1679, he was admitted into the council of 30, and subsequently became one of the 4 confidential advisers of the crown, who had the real control of the government. In the great debate on the exclusion bill in 1680, it was owing almost entirely to his oratory that the house of lords rejected the bill. Although he had supported the right of the duke of York to the succession, he advocated measures to strengthen the cause of civil liberty in this and the next reign, and labored strenuously to deprive the duke of all share in the government, to form an alliance between England and Holland, and to cause the English government to break with France. On the accession of James II. he was obliged to give up his position as lord privy seal, which he had received in 1682, and accept the presidency of the council. As however he refused to support the king in his effort for the repeal of the test and habeas corpus acts, he was dismissed from office, and from that time was one of the most active and influential members of the opposition. He seems to have known of the invitation to William of Orange to invade England, but refused to join in it. After William had landed he was appointed by James one of the commissioners to treat with him. When parliament met he was appointed speaker of the house of lords, and supported the claim of William as king regnant, presented the crown

to William and Mary on their accession, and was made lord privy seal, much to the indignation of the whigs. The discontent increased in consequence of the mismanagement of the affairs of Ireland, and an unsuccessful attempt was made in the house of commons to carry a resolution in favor of his dismissal from the service of the crown. Not long afterward Halifax retired from the speakership of the house of lords, and a little later gave up the privy seal, went into opposition, and afterward acted for a short time with the Jacobites. He was a very able statesman, and the chief of the party contemptuously called trimmers, a name which however he accepted and defended. He wrote several works on political subjects, all remarkable for the elegance of their style. Among them may be mentioned "Character of a Trimmer," "Anatomy of an Equivalent," "Letters to a Dissenter," "Miscellanies," and "Maxims of State." Two manuscript copies of his memoirs which he left were both destroyed. He was succeeded by his son William Savile, with whose death the titles became extinct. He left also a natural son, Henry Carey, celebrated as a dramatist, from whom Edmund Kean descended.

SAVILLE, SIR HENRY, an English scholar and mathematician, born at Over Bradley, Yorkshire, Nov. 30, 1549, died at Eton college, Feb. 19, 1622. He was graduated at Merton college, Oxford, received a fellowship, served as proctor for 2 years, made the tour of the continent in 1578, and upon his return became tutor in Greek to Queen Elizabeth, by whom he is said to have been highly esteemed. In 1585 he was chosen warden of Merton college, and in this position continued 38 years. In 1596 he was made provost of Eton college. James I. knighted him in 1604, and was anxious to advance him to some preferment in church or state; but all such offers Savile declined. He was a munificent patron of Oxford university, founding professorships, and contributing books and rare manuscripts to the libraries. On his death that institution paid him the unusual honor of having a public speech and poem delivered in his praise, which were subsequently published under the title of *Ultima Linea Savilii*. Savile made a collection of the best English historians under the title of *Rerum Anglicarum Scriptores post Bedam* (1596), and edited the works of St. Chrysostom, in Greek (8 vols. fol., 1613); on this edition he is said to have expended the sum of £8,000. His mathematical reputation rests chiefly on his "Lectures on the First Book of Euclid's Elements" (4to., 1621).

SAVINGS BANK, an institution for the deposit of the savings of the poorer and middle classes. The first banks for savings were those of Hamburg, founded in 1778, and of Bern in 1787, intended for and restricted to servants, mechanics, &c. A suggestion of a frugality bank was made by Jeremy Bentham in 1797. The first attempt to establish one in England

was that of the Rev. Joseph Smith of Wendenover, who in 1799, in conjunction with two of his parishioners, offered to receive from any inhabitant of his parish any sum from 2d. upward every Sunday evening during the summer months, and to repay to each individual, at Christmas, the amount of his deposit with an addition of  $\frac{1}{4}$  of the sum as a bounty for his frugality. If the money was paid back before Christmas, the depositor received no bonus. A nearer approach to our modern savings banks was made by Mrs. Priscilla Wakefield at Tottenham, Middlesex, in 1804. It was called the charitable bank. In conjunction with several benevolent gentlemen who acted as trustees, and undertook each to receive an equal part of the sums deposited, Mrs. Wakefield took deposits of 20 shillings and upward, and allowed 5 per cent. interest annually on these sums when left in the hands of the trustees for at least a year. Mrs. Wakefield had as early as 1798 established a bank for the saving of small sums by children. In 1807 the Rev. John Muckersy established the West Calder friendly bank in Scotland for the savings of the poor. In 1808 a society of 8 persons, 4 of whom were ladies, was formed to receive the surplus earnings of domestic servants, and allowed 4 per cent. interest thereon. In 1810 the Rev. Henry Duncan, D.D., of Rothwell, Dumfriesshire, formed the parish bank friendly society, and within 4 years had accumulated £1,160, bearing interest at 5 per cent. In 1813 Mr. J. H. Forbes of Edinburgh started a savings bank in that city, without any knowledge of Dr. Duncan's movement. Mr. Forbes, who was connected with a large banking house, allowed 4 per cent. the first year, and 5 per cent. afterward, and when the deposits reached £10 exchanged them for interest notes of Sir William Forbes and co.'s bank. In 8 years he had received £8,316 14s. from 1,887 depositors. In Jan. 1815, the provident institution of Bath, afterward called the Bath savings bank, was established, and the parochial bank of Stillorgan in Ireland about the same time. At the end of 1816 there were 74 of these banks in England and Wales, and 4 in Ireland. Parliament first made savings banks a subject of legislation in 1817. The present laws provide that they shall only be established with the approval of the commissioners for the reduction of the national debt, the rules of the bank being filed with them for examination; and that trustees and managers shall have no salary or pecuniary benefit from the bank they administer. These trustees appoint and dismiss all needful officers, and fix their salaries, the officers giving bonds for the faithful execution of their trusts to the comptroller-general of the national debt commissioners; the trustees are not personally responsible for losses except through wilful neglect, unless they voluntarily agree to become so; all moneys deposited are to be paid by the bank to the bank of England or Ireland exclusively, to the credit of the commissioners, who

are to invest them either in bank annuities or exchequer bills. The interest paid by the commissioners to the banks is  $8\frac{1}{4}$  per cent., and the maximum rate paid by the banks to depositors is  $8\frac{1}{4}$  per cent., though the average rate is only  $2\frac{1}{4}$ . No person is allowed to have a deposit in more than one savings bank at a time; the minimum deposit ranges from 1s. to 5s.; not over £30 can be deposited in a year, nor more than £150 in all from one depositor; and when by the addition of compound interest the amount deposited reaches £200, interest on it must cease. Usually a notice of from 7 to 21 days is required for withdrawal. On Nov. 20, 1858, there were in the United Kingdom 606 savings banks, with 1,261 paid and 621 unpaid officers, 1,398,886 depositors, and £35,757,455 of deposits. The expenses of management were about  $\frac{1}{4}$  of 1 per cent.—In the United States the first savings bank was opened at Philadelphia in Nov. 1816, though Franklin had suggested something of the kind 50 years earlier. The second was organized in Boston the same year, and the third in New York (the Chambers street institution for savings) in 1819. Since that time they have greatly multiplied. In each state there are laws for their regulation. In some each bank has a special charter, in others they are organized under a general law; but in either case they are required to make an annual report to the legislature, and in most they are under the inspection of bank commissioners or superintendents, who several times in the course of the year investigate their condition, and report to the legislatures in regard to them. The interest allowed varies from 3 to 7 per cent. In most of the banks 6 per cent. is allowed on sums under \$500, and 5 per cent. on any excess over that sum. Usually \$1,000 is the maximum amount which any individual may deposit, but there is no regulation to prevent deposits being made in several banks. Formerly \$1 was the minimum deposit allowed, but of late years banks have been organized as five cent, dime, or sixpenny savings institutions. The deposits are variously invested according to the views of the managers, who are generally men of wealth, and have or are supposed to have no pecuniary interest in the profits of the investment. In the smaller towns and cities they are generally lent on first mortgage of real estate to an amount not exceeding  $\frac{1}{4}$  or  $\frac{1}{2}$  its appraised value; in the larger cities they are usually invested in U. S. or state bonds, or in bank or other stocks. In some instances the practice has been allowed of investing in mercantile paper, and railroad or insurance stocks and bonds, but this is now generally forbidden. The managers of these institutions are regarded as liable where defalcations have taken place through their neglect, and in such cases are usually held to a rigid accountability. For the most part the savings banks are well managed; and from the care with which their deposits are invested, and the number of dormant accounts accumulating in a series of years, they are gen-



erally able to reserve a large surplus and erect substantial banking houses. Among the experiments in finance attempted during the years of prosperity preceding 1857, were the organization of "joint-stock savings banks" and "savings banks and building associations." The first had a subscribed capital, of which usually not over 10 per cent. was paid in, ostensibly as a guaranty to depositors, but really to afford an opportunity for profitable investment to the corporators. The deposits were used in the most apparently profitable speculations which offered, whether they were fancy stocks, mercantile paper at large discount, railroad stocks, bonds, or real estate investments; and while 6 per cent. was paid to the depositors, the stockholders gained handsome profits on their stock. When reverses came, however, the depositor was sure to suffer. The second class of institutions received monthly deposits of a small percentage toward a capital to be made up in full within 5 or 6 years, and lent the money thus received to their depositors in sums of from \$200 to \$3,000 at simple interest and a very heavy bonus, paid quarterly or semi-annually, and secured by a first mortgage of a house and lot which it was to be used to complete. If the depositor did not take a loan, his profits on the deposit were large; if he did, the bonus paid for the loan made his interest usually from 18 to 36 per cent. per annum. These institutions are now generally closed by the repeal of their organic law.—There are no available statistics of the number of savings banks in the United States, but it may be stated in general terms that they are far more numerous in the northern than in the southern states. In the state of New York there were on Jan. 1, 1861, 72 of these institutions, with 310,693 depositors, and deposits to the amount of \$67,450,897. Of these, 25 were in New York and Brooklyn, with 255,485 depositors and \$55,780,572 on deposit. The following table shows the increase in the business of these institutions in 5 years:

Date.	No. of banks.	Deposits.
Jan. 1857.....	66	\$41,699,502
" 1858.....	66	41,422,672
" 1859.....	66	48,194,847
" 1860.....	69	58,178,160
" 1861.....	72	67,450,897

In 1860 these banks had a money surplus of \$2,552,085. The deposits of two of the New York savings banks (the Bowery and the "bank for savings") were each over \$10,000,000, and of the seamen's bank nearly \$9,000,000. In the same year the 86 savings banks of Massachusetts had 205,409 depositors and \$39,424,419 on deposit; the average interest for the year was 5.01 per cent., and for the last 5 years 6.62 per cent.; \$8,654,264 was lent on personal security, and the remainder invested in mortgages, real estate, county, town, state, and U. S. stocks and bonds, and bank and railroad stock. Connecticut had 64 savings banks, with 88,925 depositors and \$18,182,821 on deposit; \$1,317,103 was invested in personal securities, the re-

mainder in real estate mortgages, U. S. and state stocks and bonds, and railroad stocks and bonds. Vermont had 12 savings banks, with \$1,145,268. New Hampshire had 26, with \$4,860,025 on deposit, and \$207,491 surplus. Rhode Island had 21 banks for savings, with 81,838 depositors and \$7,765,771 on deposit. There was thus in 1860 an aggregate of \$139,000,000 deposited in these institutions in New York and 5 of the New England states.—In France the first savings bank, that of Paris, was incorporated in 1818; one was established in Bordeaux in 1819, and one in Marseilles in 1821. In 1856 there were 363 banks, with 936,188 depositors, and 272,182,542 francs on deposit. The usual net rate of interest is  $3\frac{1}{2}$  per cent.; in a few cases it is  $3\frac{1}{4}$ . No sum less than a franc can be received; nor can any individual deposit more than \$60 in one week, or more than \$200 in the whole unless he is a soldier or sailor. All moneys received, except a sufficient sum to carry on the business of the bank to the next receipt day, are paid over within 24 hours to the *caisse des dépôts* for investment in the government securities. A fortnight's notice is required for withdrawals; accounts not claimed or operated on during 80 years pass to the government. Inspectors are appointed by government, who examine the affairs of each bank critically every 3 months, and report both to the minister of finance and the minister of agriculture and commerce.—In Switzerland savings banks date from 1787. In 1852 there were 167 banks, 181,172 depositors, and deposits to the amount of \$11,650,170. The investments are mostly in mortgages on real estate and discounts of mercantile bills.—In Prussia the first savings bank was that of Berlin, founded in 1818. In 1851 there were 215, with 278,147 depositors, and 18,119,851 rix dollars on deposit. The rate of interest varied; in 28 banks it was  $2\frac{1}{2}$  per cent.; in 85, 3 per cent.; in 152,  $3\frac{1}{2}$  per cent.; and in 5 it ranged from 4 to 5 per cent. The minimum deposit is 5 *Silbergroschen* (about 12 cents), and the maximum 10 thalers (\$7.50) in any one month, and 100 thalers (\$75) in all. In Berlin the depositors were in 1851 as 1 to 11 of the whole population. In Austria and Hanover the number of savings banks is small, and the depositors are not more than 1 in 42 to the population. In Bavaria and Saxony they are more numerous. In Frankfurt-on-the-Main they are 1 in 11; in Hamburg, 1 in 7.4; in Altona, 1 in 2.6. In the remainder of Europe, except Italy, there are as yet few of these institutions, though in some of the states their advantages are beginning to be understood. In Italy, especially in Sardinia and Lombardy, the *casse di risparmio*, though in name savings banks, yet are intended for and receive the deposits of the higher classes rather than of those who are their usual patrons in other countries.

SAVONA, a fortified town of N. Italy, in the province of Genoa, situated on the W. side of the gulf of Genoa, 20 m. S. W. from

the city of that name; pop. in 1859, 18,859. The cathedral contains many fine paintings, basso-relievos, and sculptures. There are manufactories of silk goods, iron, and earthenware. The town had formerly two harbors, but the Genoese from jealousy partially filled the best one in 1525, and only small vessels can now enter the port. A considerable trade is carried on in fruit, wine, and silk.

SAVONAROLA, GIROLAMO, an Italian monk and reformer, born in Ferrara, Sept. 21, 1452, executed in Florence, May 23, 1498. His early education was directed to the medical profession, but at the age of 17 he entered a Dominican convent at Bologna, and after suitable preparation was sent to preach in several cities of Lombardy, in Ferrara, and finally in Florence, whither his reputation for wisdom, eloquence, and sanctity had preceded him. It was said that in a voyage down the Po, while travelling from Mantua to Ferrara, 11 of the boatmen had been converted by him. Public expectation was high, but was sadly disappointed by the diminutive size of the new preacher and the awkward gestures, the violence of manner, and the profusion of imagery that characterized his discourse. He was first ridiculed and then neglected; and in disgust he retired to Bologna, where for a time he gave himself to teaching mathematics and physical science. Recalled in 1489 to Florence by Lorenzo de' Medici, his sermons were listened to with eagerness. He became reader and afterward prior in the convent of San Marco, the strictest in Florence of the Dominican order. He preached incessantly, thundering with terrible vehemence against the sins and corruptions both of court and people, and threatening the most fearful penalties. His influence with the Florentines became that of a dictator. Peter II., the successor of Lorenzo, vainly sought to silence him by presents, and the profligate Pope Alexander VI. by the offer of a place in the sacred college. He rejected the offers with contempt, and declared that "he wished no red hat but one reddened with his own blood, the hat given to the saints." The expulsion of Peter II. by the Florentines gave still wider scope to the daring monk's activity. He became a political as well as a religious leader, vindicated the rights of the republic against foreign aggressions, and proposed for the state a species of theocratic constitution, by which Christ should be king, and the monastic rules the general model of civil order. He proclaimed war upon all amusements, proposed a rigid scrutiny of morals, and even demanded the removal of the pope. A sentence of excommunication fulminated against him, which he disregarded, only increased his popularity. Supported by a number of powerful friends, he continued his harangues, organized processions, and held public *autos da fe*, in which beautiful and licentious works of art were destroyed. But after a time, the combination of some powerful families with the pope and the Franciscans, upon whom he had been especially severe,

became too strong for him. The ridicule caused by the failure of the ordeal by fire that he had proposed added to his discomfiture. Condemned to banishment, he shut himself up in his convent of San Marco; he was attacked in that asylum; a violent contest ensued, blood was shed, and finally to save the convent he gave himself up to the commissaries of the Florentine council. The pope demanded that Savonarola and his two companions, Domenico Buonvicini and Silvestro Maruffi, should be sent to Rome for punishment. This the Florentine council refused, but allowed the two papal delegates to share in the trial. The prisoners were sentenced to death and hanged, and their bodies afterward burned by the executioner.—Savonarola left numerous ascetic and political writings, and some religious poems of no great merit. In his "Triumph of the Cross" he strives to show the truths of religion by philosophical arguments, and to bring the natural and supernatural together. In his treatise on "The Division and Utility of the Sciences," he rejects all pagan authors, and would substitute for these the study of the fathers. Though he denied the infallibility of the pope and inveighed against the sins of the monks and clergy, he professed loyalty to the church, and was strict in the observance of its forms. His complete works were published at Lyons (6 vols., 1633-'40), and portions of them have been translated into various languages. His life has been often written; one of the latest and best biographies is by F. T. Perrens (2 vols., Paris, 1854), who has investigated the whole subject from new and original sources, and has disproved many of the false statements of previous biographers. A still more recent biography, with many documents not before published, is that by Pasquale Villari (London, 1861).

SAVOY (Lat. *Sabaudia*; Ital. *Saraja*; Fr. *Savoie*), formerly a duchy and one of the Sardinian states, now a part of France, to which it was annexed in 1860, situated between lat. 45° 4' and 46° 24' N., and long. 5° 37' and 7° 5' E.; area, 4,197 sq. m.; pop. in 1856, 581,833. Its length from N. to S. is 92 m. and its greatest breadth from E. to W. 75 m. It is bounded N. by the canton and lake of Geneva; W. by the department of Ain, from which it is separated by the Rhône; S. W. by the departments of Isère and Hautes-Alpes, being divided from the former by the Guiers, a tributary of the Rhône, and from the latter by the Maurienne ridge, an offset of the Cottian Alps; and S. E. and E. by the Cottian, Graian, and Pennine Alps, with their ramifications projecting toward the lake of Geneva, which separate it from Piedmont and the canton of Valais. This winding range contains the loftiest peaks and most magnificent glaciers in the whole Alpine system. Among the former are Monts Blanc, Maledetto, Buet, Iséran, the Little St. Bernard, Anvert, and Tabor; and among the latter Iséran, Clou, and Chamouni. The country is inter-

sected by several of its offsets, viz.: the Alps of Savoy, branching from the Little St. Bernard, and covering, with their ramifications, most of the central and western districts; the Savoisan and Valaisian ridge, extending from the Pennine Alps S. of the lake of Geneva; and La Vanoire, which diverges from Mont Iséran and describes a curve toward the W. S. W. The streams which drain the numerous valleys lying between these ridges generally rise in the main chain in the east, and flow directly or indirectly into the Rhône; the Dranse, which flows northward to the lake of Geneva, the Arve, Chéran, Isère, and Arc, an affluent of the preceding, flowing westward, are the most important. Beside the great lake on the N., Savoy possesses those of Bourget, Annecy, Morion, Haute-Luce, and Mont Cenis, which, though much smaller, are scarcely less picturesque, and the subterranean lakes in the cave of Bauge. Mineral springs are abundant; those of Aix, St. Gervais, and Evian are the most famous; and there are curious intermittent springs at Pigros and Haute-Combe. Gold has been found in the sands of some of the rivers. Mines of argentiferous lead are wrought at Maco, Pesey, and St. Jean de Maurienne; and there are mines of copper, iron, and lignite, anthracite, and bituminous coal, and quarries of marble, granite, slate, jasper, and porphyry. The mountain forests furnish good timber for ship building and other purposes. The extent of arable land is not considerable, but every acre of it is cultivated; beside the valleys, which present an uninterrupted succession of cultivated fields, orchards, and gardens, the steepest declivities of the mountains are made productive; terraces are constructed, mould and manure are carried up from below, and the soil is irrigated by means of reservoirs on the summits. Wheat, oats, barley, rye, hemp, and fruits are extensively cultivated; and there is even a surplus of wheat for exportation. Chestnuts serve as a substitute for bread among the poorer people. Vines thrive on the sunny side of hills, even in the vicinity of glaciers; and the wines which they produce are of good quality. Mulberry and walnut trees are cultivated, the nuts of the latter yielding oil. Numbers of cattle are reared and exported to Piedmont and Lombardy. The rivers teem with every kind of fish, and the streams and lake at the foot of Mont Cenis, the Chéran, and the Guiers are famous for trout. The climate, though variable, is healthy and mild; the cold is severe only on the mountains. The inhabitants, in manners, language, and sympathies, have always been essentially French. They are kind, honest, hospitable, and intelligent, fond of their country, and loath to leave it permanently, though as many as 30,000 of them find employment during the winters in France, Switzerland, Italy, and Spain. The majority, if not the whole of those who do not emigrate are land owners, the soil being generally distributed in very small parcels. Although agri-

culture is the chief pursuit, manufactures are beginning to thrive; there are 40 foundries and iron works, several linen, cotton, and woollen manufactories, paper mills, tanneries, breweries, and distilleries. Education is in a prosperous condition, nearly every commune having at least one primary school, and both primary and secondary schools being free. There are several flourishing colleges.—This country belonged originally to Transalpine Gaul, and was inhabited by the Allobroges, Centrones, Nantuates, &c. Under the Romans it formed the provinces of the Graian and Pennine Alps. In the 5th century it was invaded by the Burgundians, subsequently became subject to the Franks, was included in the Carolingian empire, and on its dissolution in 887 was granted by the diet of Tribur to Rudolph, king of Transjurane Burgundy. Becoming afterward a part of the German empire, it was erected into a county by the emperor Conrad II. in 1027, and continued to be ruled by the house thus founded until 1860 (see SAVOY, HOUSE OF), when by the treaty of Turin (March 24) it was ceded to France, on condition that the inhabitants should approve of the transfer. The vote was taken April 15 and 16, and showed a large majority for the annexation; in accordance with which the treaty of cession was officially promulgated June 12, and the delegates of Napoleon III. took formal possession of the country. Very little change has taken place in its administrative organization; the two general intendencies of Chambéry and Annecy, the former including the provinces of Chambéry, Upper Savoy, Maurienne, and Tarantaise, the latter those of Annecy, Faucigny, and Chablais, have become respectively the departments of Savoy and Upper Savoy. The former consists of the S. part of the duchy; area, 2,425 sq. m.; pop. in 1856, 813,891; chief town, Chambéry. The latter occupies the N. part, and is washed by the lake of Geneva; area, 1,772 sq. m.; pop. in 1856, 267,942; chief town, Annecy. There is an archbishopric of Chambéry, with 8 bishoprics at Moutiers, St. Jean de Maurienne, and Annecy.

SAVOY, HOUSE OF, a sovereign family of Italy, one of the oldest, if not altogether the oldest, of the reigning dynasties of Europe. According to tradition, the founder of this family was Umberto Blancamano (Humbert White Hand), the reputed offspring of some powerful Italian or Burgundian prince, who, in reward for valuable services, received in 1027 from Rudolph III., king of Transjurane Burgundy, the counties of Savoy and Maurienne, with the title of count, and from Conrad II. of Germany part of Faucigny, Lower Chablais, and the valley of Aosta. His nephew, Amadeus II. (1060-'80), in right of his mother Adelaide, heiress to the marquise of Susa, added nearly the whole of Piedmont to the above named possessions. Humbert II., son of Amadeus (1080-1108), extended his dominion over Tarantaise, Vaud, Upper Chablais, and part of Valais. Thomas I., great-grandson

of Humbert (1188-1233), supported Frederic II. in his contest with the popes, received as a reward the title of imperial vicar for Piedmont, and in 1232 made Chambéry his capital. Amadeus IV. (1233-'53) was like his father Thomas a faithful adherent of the emperor, compelled the city of Turin to acknowledge him as lord, and finally ceded Piedmont to one of his brothers, Thomas, who was already count of Maurienne. Another brother, Peter (1233-'8), before coming to the throne, for 9 years served Henry III. of England, who bestowed upon him the earldoms of Richmond and Essex; he won the surname of Charlemagne the Little, inherited the district of Geneva, and forced back into submission Turin, which had rebelled. His nephew, Amadeus V. the Great (1285-1323), assisted Philip the Fair of France in his war against Flanders, was the negotiator of a peace between France and England, accompanied the emperor Henry VII. in his expedition to Italy, received from him the lordships of Asti and Ivrea, and added Lower Faucigny to his possessions. Amadeus VI., grandson of the preceding (1343-'88), surnamed the Green Count from the color of his armor at a certain tournament, married Bonne of Bourbon, a cousin of King John of France, fought in behalf of the Greek emperor John Palæologus against the Bulgarians and the Turks, accompanied the pretender Louis of Anjou in his expedition to Naples, and annexed the lordships of Gex, Valromey, Coni, and Oherasco to his dominions. His son, Amadeus VII., the Red Count (1383-'91), wrested Nice and Vintimiglia from the count of Provence. His grandson, Amadeus VIII. (1391-1451), received from the emperor Sigismund in 1416 the title of duke. He purchased the county of Geneva, acquired Bugey and Vercelli, and reannexed Piedmont, which had been for over a century and a half in the hands of a younger branch of the family. He gave a code of laws to his states, and established the order of knights of St. Maurice. In 1434 he resigned in favor of his son Louis, and retired to the convent of Ripaille. Chosen pope by a schismatical faction in 1439, he assumed the name of Felix V., and held his ground against his rivals Eugenius IV. and Nicholas V. until 1449, when he resigned his pretensions and passed the rest of his life in his convent, retaining only the title of cardinal. Louis, who on his father's abdication had governed the duchy at first as regent, assumed the title of duke in 1440, married Charlotte, the daughter of the king of Cyprus, from whom this title inured to his family, and gave his own daughter Charlotte in marriage to the dauphin of France (afterward Louis XI.), whom he supported against his rebellious vassals. His son, Amadeus IX. (1465-'72), left the reins of power to his wife, Yolande, sister of King Louis XI., and his brother Philip of Bresse, and led such a religious life that he was beatified by the church. He was succeeded by his son, Philibert

I. (1472-'82), surnamed the Hunter. Being still a child on his accession to the throne, he was placed under the guardianship of his mother Yolande, who had to protect his crown against the ambitious designs of Charles the Bold of Burgundy and Louis XI. of France. Philibert died during his minority, leaving the dukedom to his brother Charles I. (1482-'9), the first prince of his house who styled himself king of Cyprus. He conquered the marquisate of Saluzzo. His son, Charles II., died a child in 1496, and the crown devolved upon Philip I., second son of Louis I., who reigned but a few months. Philibert II., the Fair (1497-1504), the eldest son of Philip, was the husband of Margaret of Austria, daughter of the emperor Maximilian I. and regent of the Netherlands, who on his premature death erected in his honor a magnificent mausoleum in the church of Brou. Charles III., Philibert's brother and successor (1504-'53), suffered severely from the wars between King Francis I. and the emperor Charles V.; after losing Valais and Geneva, which joined the Swiss confederation in 1533, and the canton of Vaud, which the Bernese took possession of in 1536, he was finally deprived of the remainder of his dominions by the king of France; these were afterward restored to his illustrious son Emanuel Philibert, styled the Iron Head, and "the prince with a hundred eyes." He was born July 8, 1528, and when scarcely 20 years old entered the service of Charles V. and distinguished himself in Flanders. In 1552 he made a fruitless attempt to reconquer his duchy. In the following year, although only 25 years of age, he was appointed to the chief command of the Spanish army in Flanders, defeated the great constable Montmorency in the battle of St. Quentin, Aug. 10, 1557, and was only stopped in his career of conquest by the duke of Guise. His services in war had given him such influence that, on the conclusion of the peace of Cateau-Cambrésis, April 3, 1559, he married Margaret of France, sister of Henry II., and received back that part of his ancestral dominions that was in the hands of the French, with the exception of a few towns and strongholds, most of which were afterward restored by the treaty of Blois in 1562. Two years later he regained most of what had been taken from his father by the Valesians and the Bernese. In 1574 he had entirely reconstructed the old duchy, and afterward added to it the principality of Oneglia and the county of Tenda, and even aimed at wresting Dauphiné from France, but his plans were frustrated. On the extinction of the family of Aviz, he presented his claims to the crown of Portugal as grandson on the mother's side of Emanuel the Fortunate, but yielded his pretensions to Philip II. of Spain. In 1560, under compulsion of the courts of Rome, Spain, and France, he persecuted the Waldenses, who were numerous in his dominions; but they offered such energetic resistance that, after his troops had been routed in sev-

eral encounters, he granted them the free exercise of their religion, June 5, 1561. Thenceforth he gave particular attention to agriculture, industry, and trade, and the condition of his duchy materially improved. He established the university of Mondovi, and restored the knightly order of St. Maurice (1572), which he united to that of St. Lazarus. He died Aug. 30, 1580. He left a "Military Diary," which has been found in the archives at Turin.—Charles Emanuel I., surnamed the Great (1580–1630), evinced a good deal of unruly ambition. Connected with Spain by his marriage with Catharine, daughter of Philip II., he took advantage of the civil troubles of France to reconquer the marquisate of Saluzzo, which had not been restored to his father, and received from the league in 1590 the title of count of Provence. But a few years later Henry IV. invaded Savoy and Piedmont, and compelled him to surrender the territories of Bugey, Valromey, and Gex to France. His younger brother, Thomas Francis, was the head of the branch of Savoy-Carignan. Charles Emanuel's son and successor, Victor Amadeus I. (1630–'37), made war against his brother-in-law, Louis XIII. of France, and was obliged to sign a disastrous peace at Oherasco in 1631. Allying himself with his former opponent against Austria, he had two successful engagements with the marquis of Leganez at Tornavento in 1686 and Montebaldone in 1687. He was succeeded by his two sons, Francis Hyacinth, who died at the end of a few months, and Charles Emanuel II. (1688–'75), who proved a faithful ally to France, and at home a patron of arts and commerce. Under his reign, the "road of the grotto" was constructed over Mont des Échelles, and the new city and royal palace at Turin were built. The fortunes of this house had been at a standstill for nearly a century, when Victor Amadeus II. ascended the ducal throne (1675). Born in 1665, he was but 10 years old when his father Charles Emanuel died; and the regency was held by his mother, Mary of Nemours. In 1684 he married Anne of Orleans, a niece of Louis XIV., but adhered to the league of Augsburg against that prince. His dominions were invaded by Marshal Catinat in 1690; and he lost the battle of Staffarde, and saw Savoy and the larger part of Piedmont subjugated by the French. Through the assistance of the imperialists, he held his ground for about 3 years; but having been defeated again at Marsaille, Oct. 4, 1693, he signed with Louis XIV. the peace of Turin (1696), which was the preliminary to the general peace of Ryswick (1697). He recovered all his possessions, and entered into close family alliance with his former enemy; two of his daughters, Adelaide and Louise Gabrielle, married respectively Louis, duke of Burgundy, and Philip, duke of Anjou, afterwards king of Spain, grandsons of King Louis XIV. At the beginning of the war of the Spanish succession he sided with Louis XIV. and his son-in-law; but, bribed by brilliant

promises, he allied himself with the house of Austria by the treaty of Turin, Oct. 25, 1708, lost in succession Vercelli, Susa, Ivrea, and the fortress of Bard, which were taken by the duke of Vendôme, and was obliged to retire to Genoa. His fortunes were retrieved by the victory of Prince Eugene of Savoy under the walls of Turin, Sept. 7, 1706; and he not only recovered his possessions, but was enabled to invade Provence. His progress was checked before Toulon by Marshal Tessé in 1707; and in the following year he was driven from Dauphiné by Marshal Villars. In 1709 he gave up his alliance with Austria, and remained neutral until the end of the war. The treaty of Utrecht (1713) added to his possessions a part of the duchy of Milan, and Sicily, which conferred upon him the title of king. He had thus obtained the object of his ambition; the house of Savoy, which had held a county for 389 years (1027 to 1416), and a duchy for 297 years (1416 to 1713), now ranked among the royal dynasties. In 1720 he was obliged to exchange Sicily for Sardinia; but, although at first the bargain did not seem advantageous, it proved beneficial in the end, on account of the proximity of the latter to the continental dominions of this house. (See *SARDINIAN STATES*.)

SAW, an instrument usually made of a steel plate with teeth along its edge, used for cutting through wood, ivory, stone, &c. The ancient Egyptians made use of saws of bronze, and applied them to cutting out planks from logs. The saws were single-handed like those now used by carpenters, and the log to be cut by them was placed on end and firmly secured to posts set in the ground. The inventor of the saw was deified by the Greeks, and called by some Talus and by others Perdix. The jaw bone of a snake with its teeth, or the back bone of a fish, according to different ancient authors, suggested the idea of the saw. The saws of the Grecian carpenters were made like the straight frame saws of modern times, the blade set across the middle of the frame with the teeth perpendicular to its plane. The block of wood to be sawn was clamped down upon a bench, and the workmen stood on opposite sides of this, one at each end of the saw.—Saws are made of various forms and sizes, according to the special purpose they are designed to serve. The older forms are straight strips of steel, either set in a frame, or simply provided with handles at each end, so as to be moved forward and back by two persons; or the plate is made stiff enough for a single handle to answer, when it is worked by one person holding it in one hand. In modern times saw blades are often circular, the teeth being made around the edge and cutting one after another as the saw revolves constantly in the same direction.—Steel plates intended for large saws are prepared from ingots carefully made to secure uniform quality, and after being rolled they are slit into the shapes for the different saws. The

edge intended for the teeth is then ground true, and the teeth are cut by a punch at a fly press, their distances apart being regulated by a gauge. The rough edges left by the punch are filed down and the teeth are sharpened. The blades are next hardened and tempered. They are heated in ovens to a red heat, and then immersed horizontally and edgewise into a trough containing oil with certain portions of melted tallow, beeswax, rosin, pitch, &c. To remove the excess of hardness they thus acquire, after wiping off a portion of the composition that adheres to them, the blades are held over a fire until that which remains ignites; this is called "blazing off." The more that is removed of the composition before this burning the harder is the blade; and thus its temper is regulated for the kind of saw required. To give it uniform density throughout, the blade is next hammered over its face upon an anvil of polished steel; this is called "planishing" or "smithing." The next process is grinding the surface in order to reduce the thickness of the metal from the teeth toward the back edge. Small blades are held against the stone by means of a board laid upon them, and the large saws are suspended at each end. The finishing processes are repetitions of the planishing and grinding, together with polishing by smooth stones and with emery.—The teeth are variously shaped for different saws. The most simple are made by angular notches, the angle at the apex of the notch being of  $60^\circ$ . This is most convenient for sharpening, as the common triangular or "three-square" file is just adapted to its figure; and whether the cut slopes in at right angles to the line of the blade, or is pitched to one side, so as to make teeth pointed toward one or the other end of the saw, this file fits both sides of the notch and can always be used for sharpening the teeth. When the teeth are made with equal sides, they are said to have an upright pitch; and when they make a zigzag of alternating long and short lines, they are said to be flat or to have considerable pitch. The former are adapted for cross-cut saws, worked by two men, one at each end. Such teeth lack the chisel-like effect of those of a low pitch, and rather scrape away the wood than tear into it like the latter, which cut only when the saw is moved in the direction toward which the teeth point. Hand saws in the United States and England have the teeth pointed from the handle; in Asiatic countries and in Greece they have always been made with teeth pointed the other way. The former cut in pushing, the latter in pulling. A straight cut upon a line can probably be made better by the thrusting cut, and in this the sawdust is thrown out more freely; but the force is certainly applied to better advantage as regards the saw in pulling it in the line of its greatest strength than in pushing; and for very slender saws in which it is an object to dispense with all unnecessary width and thickness, as in the keyhole and other similar sorts, it would

appear decidedly better to adopt the East Indian practice. Some large saws are notched at a sharper angle than  $60^\circ$ , and for these special files made for the angle are used, and are known as mill-saw files. Teeth made at a low pitch in large saws would become clogged with sawdust unless the space between them were enlarged, and the various forms in which this is done give distinctive names to the teeth. In large mill saws and circular saws the space between the teeth, which may be 2 or 3 inches, is hollowed out in a curve, and the outline is much like a fish hook in form, the shank of the hook bending back to make the back of one tooth, and the point curving round to form the under side or face of the next. All saws used for cutting wood require some provision against their liability to become jammed and the teeth clogged in the narrow passage they make for themselves. This is sometimes effected by making the blade thinner toward the back, but the most effectual mode is in the "set" given to the teeth. In finishing the saw the last process is to bend half the teeth a little out on one side, and the other half on the other side. In the eastern countries a group of a dozen teeth or thereabout are bent to one side, and the next group to the other; but the common practice in other countries is to alternate the direction with each successive tooth. The operation is performed by the saw maker with a small hammer, as he holds the saw with the teeth resting on the rounded edge of a small anvil. Every other tooth on one side having received the proper bend, he turns the saw over and continues the operation with those on the other side. The same may be done with the saw set, which is a bit of steel with slits suited to the different thicknesses of saw blades. The amount of set varies with the sort of service the saw is intended for. The more likely the material is to clog, the wider must be the spread of the teeth; but if the waste of the wood is a consideration, and also the greater labor involved in a wide cut, the set should be as little as possible, and the friction may be diminished by any lubricating substance, or by relieving the pressure upon the saw with wedges following up the cut it makes.—Of the saws used by carpenters, the most common are the hand saw and fine hand saw, the teeth of which are of ordinary pitch; that is, one face of each is perpendicular to the blade. The former is about 26 inches long beside the handle, and contains from 5 to 6 teeth to the inch. These saws are used for the varieties of cross cutting, while for sawing with the grain, or ripping, special saws called rip saws and half rip, with coarser teeth of upright pitch, or half way between this and ordinary pitch, are employed. All these saws may cut to any depth, as they pass freely through the cut or kerf they make; but for fine work and cuts not so deep as the ordinary width of a saw blade, a special form is adopted known as the back saw, having fine teeth and a thin blade which is stiffened by a

strip of brass or sheet iron bent over the back edge, which it tightly grips. These are also known as "parallel saws with backs," and are much used to saw off ends either square or at an angle of  $45^\circ$ , the pieces to be cut being placed in what is called a sawing block or mitre box, which is a trough open at top and at the ends with vertical cuts for the saw down the two opposite sides, one set square across and two others directed one to the right and the other to the left at an angle of  $45^\circ$  with the side. For framing panel work, cutting off tenons, dovetailing, &c., this variety of saws is particularly useful. Keyhole saws are long and slender so as to admit of being easily turned around in making a kerf. For fine curved work the saw blades are very narrow and are stretched in frames. At the ends they are secured to clamps which can turn in the frame, so that the blades are made to follow any line, however crooked. Of some, called hair saws, the webs or blades are extremely minute, their width not exceeding  $\frac{1}{16}$  of an inch and thickness not more than  $\frac{1}{4}$  of this.—Circular saws were in use in 1790, and some forms employed for cutting the teeth of clock wheels ever since the time of Dr. Hooke. For cutting wood they were first brought into important service in the machines invented by M. I. Brunel for making ships' blocks, and adopted by the British admiralty board in Portsmouth in 1804. From that time they have continued in constant use and in various forms for different applications. The teeth cut around the edge of the disk all point the same way, and act continuously one after another as the saw revolves upon its axis, and the block is pushed against it. Saws of this kind commonly run in a slit through a table, upon which the board or other material to be sawed is placed and pushed on against the descending teeth. They are made to revolve with great rapidity, and the teeth for those intended to work in soft wood and with the grain are made well apart and inclined and curved even to the fish hook form; they consequently tear into the wood with great effect. For harder wood the teeth are made smaller and more upright. Their diameter should correspond to the size of the pieces they are to cut, and as a general rule should be 4 times the average thickness of the work. If the kerf is so deep that a considerable portion of the upper semicircle of the saw is buried in it, the friction is apt to be too great. For cutting veneers the blades are made as thin as possible with due regard for strength and stiffness. One form of veneer saw used in England is that of a lens with a very thin saw secured around its outer edge in segments. The lens is from 5 to 20 feet in diameter, and is suspended, the convex side upward, at the end of a vertical axis which passes through its centre. The saw segments which form the outer edge of the plate are flat on the lower side, while the upper surface is bevelled down to a long sharp edge, the section being like that of

a chisel. The block from which the veneer is to be cut is brought up against the saw as it revolves horizontally, and while it cuts under the thin slice it also lifts it by the action of the wedge-shaped edge. From 12 to 18 slices may thus be made in each inch thickness. Circular saws are of all sizes, from the large diameter named down to even half an inch, the latter being the diameter of the small saws used in the gold pen manufacture. Crown or cylindrical saws are used like the trephine of the surgeon for making annular cuts around a central core, which being removed leaves a circular hole. The saw is a thin tube of steel with the teeth cut in the end. They are adapted particularly for use in the lathe and for work in thin material, as in thick blocks they soon become clogged and must be often taken out to free them from the dust. Brunel applied this form for cutting out round blocks in his machine referred to above. It is said that some of the sarcophagi of the ancient Egyptians bear the marks of having been hollowed out with tools of this kind, the cylindrical cut being first made with a metallic tube primed with sand and water, and the core being then broken out. The process was many times repeated until the cavity was made sufficiently large and deep. The same method is still practised. The saws without teeth employed in cutting blocks of stone are described under MARBLE.—The largest saws in the world for sawing boards and plank are probably those made expressly for the California market, where they are wanted for the gigantic timber of that region. At the saw factory of Messrs. R. Hoe and co., in New York, circular saws are made of 80 inches diameter and a fourth of an inch thick, and mill saws and cross cut saws 10 feet in length. At this establishment are produced nearly all the varieties of saws in use, from circular saws of 4 inches diameter up, and from the common wood Sawyer's saw to the largest mill saws. Some of the articles are peculiar to the United States, as also the processes employed. The steel plates are almost entirely imported from England; some are received also from Philadelphia, where their manufacture has been introduced. The first operation to which they are subjected is cutting the teeth, which is effected in power presses, the die cutting out with each descent the whole tooth, however large and however thick the plate. The circular plate is set for receiving the stamp upon a stand in front of the press, and, turning on its centre, is moved round after each clip just the width of the tooth, the space being regulated by a graduated circle. Different presses are employed for the different classes of saws, and each is furnished with a variety of dies adapted to the different sizes of teeth. After cutting the teeth, the next process is straightening the plates. This is done by the universal method of striking them as they are laid upon a broad anvil, the workman being guided by frequent sighting along the edges. The saws are then



ready for grinding upon each face. For this purpose the mill and other straight saws are taken to the grinding room, where a number of large grindstones are kept running. The saw is applied upon one of these in various directions, the workman pressing it down with much exertion, and occasionally gauging it to ascertain where it is thickest. To facilitate this most laborious operation a novel apparatus has been recently introduced, invented by Mr. Dodge of Cohoes Falls, N. Y. In front of the grindstone is set, on the same plane with it, a wooden wheel of equal diameter and width of face with the grindstone. It is enclosed in a jacket of wood, with just space enough left for the saw to slip round when laid on the face of the wheel. It is introduced endwise through an opening in the jacket, and the end slipping into a crevice made to receive it, the saw is drawn in and carried round, adapting itself to the curvature. The machine is then brought up against the stone, the wheel is made to revolve in a contrary way to the revolution of the grindstone, and the face of the saw is uniformly ground, first on one side, and then, being turned over, on the other also. The same contrivance is adapted to polishing by the use of a polishing wheel after the grindstone. Circular saws before grinding, and occasionally also in the course of this process, are suspended on a mandrel and balanced in order to indicate the side which is thickest and heaviest. The apparatus for grinding was invented by Mr. Illoe, and its use is limited to his factory. The principle is that of the apparatus for grinding the lenses of telescopes and microscopes. The saw being secured against another upright plate is made to revolve with it, while the grindstone, set in a frame that traverses regularly back and forth in front of the saw, is made to press against it and thus distribute its action uniformly over every part of the plate. A new method of forming the teeth of large circular saws is in use to some extent in this establishment. Instead of cutting them in the plate, they are made separate from the saw, and slipped into slots made to receive them, being held by the V shape of the edges of the slots and the corresponding depression in the edge of the teeth to fit them. The advantages are that the plates do not wear out, as instead of cutting the teeth in deeper and deeper as they wear away, the inserted teeth, as they are called, can be readily taken out, dressed, and replaced, or new ones may be substituted for them. Extra sets of the teeth are supplied to purchasers, and this is often a great convenience for those requiring large saws in remote districts. All large saws, though kept sharp by filing, occasionally require re-toothing, and for this purpose are sent back to the factory until they are worn out. A portable machine, however, called a gummer, having a powerful leverage worked by hand, is furnished by which the sawyers may themselves re-tooth plates of moderate thickness. The oldest factory for large

saws in the United States is probably that founded by William Rowland in Philadelphia in 1802, and still known as Rowland's saw works. This is the only place in the country where saw plates are rolled. There are several other saw factories in the same city.—The earliest notice of saws being run by power is contained in a MS. of the 13th century in Paris, in which is a representation of the saw mill with a self action turned by a water wheel. The contrivance is probably of much earlier date. Beckmann finds evidence of saw mills worked by water power in Augsburg, Germany, as far back as 1322. In the island of Madeira one is said to have been in operation in 1420, and the first one in Norway was built in 1530. In Holland they were in use more than 100 years sooner than in England; and the Dutch furnished the English with lumber. The operation of one at Lyons is quaintly described in 1555 by the bishop of Ely, then British ambassador at Rome. The first recorded attempt to establish a saw mill in Great Britain was made near London in 1663 by a Dutchman; but the enterprise was abandoned on account of the opposition of the hand sawyers. In 1700 the advantages offered by this improvement were set before the public by one Houghton; but no one ventured to introduce it until 1767 or 1768, when by the desire of the society of arts a saw mill was built at Limehouse by James Stansfield. It was soon, however, destroyed by the mob. In the American colonies the importance of this expeditious means of obtaining sawed lumber was generally felt, and efforts were early made to obtain the necessary machinery such as was used in Holland. In 1634 a saw mill was put in operation at the falls of the Piscataqua, between Berwick and the Cocheco branch of that river, and this is supposed to have been the first mill of the kind in New England. In New York as many as three mills were constructed by the Dutch West India company about the year 1633, to run by water power or by wind. One of them was on Nut or Governor's island, which was leased in 1639 for 500 merchantable boards yearly, half oak and half pine. Another was built on Saw Mill creek, a small stream which flowed into the East river from the pond known as the Collect, in the low ground between the park and the upper part of Pearl street. On the Delaware saw mills were erected by the Dutch and Swedes before the arrival of Penn. Mention is made of several in the colony on the South river, in the present state of Delaware, in 1658, 1662, and 1678. In Virginia it does not appear that any saw mill was in operation until some time after 1650, although attempts were made to introduce the machinery and workmen skilled in its use as early as 1620. The saw mills up to the present century were more remarkable for their numbers than for great extent of single establishments. They were found in the timber districts along the rivers which brought to them the logs and furnished the power for sawing them; and

they were built upon numerous little streams in the settlements, each mill commonly provided only with a single saw, which kept the neighborhood supplied with boards; and a grist mill under the same roof shared with the saw the advantage of the water privilege. The introduction of the steam engine rendering the business independent of water power, mills were established on a larger scale at the most convenient localities for receiving supplies of timber, and especially near large towns on the coast and rivers, and the process was extended to several new branches of manufacture. (See CLAPBOARD, and SHINGLES.) Saw mills are constructed with straight saws running in frames up and down, singly or in gangs of 6 to 20 set parallel to each other, the space separating them being the required thickness of the boards or planks. Mulay saws are single saws a foot wide, the common mill saw being only 8 inches. They are not set in a gate or frame, but are held above by an iron rod running in a guide, and are pulled down by another rod which connects the lower end with a crank. The log is supported upon a low carriage running on a rail track, and with each stroke of the saw this carriage is moved forward by a pinion fixed to the axis of a ratchet wheel; and thus the log is kept constantly up to the saw, until this has passed through its length. The carriage is then run back by hand or otherwise, and the log is placed in position for the next cut, or is taken off and a fresh one is rolled on. Where timber is abundant the mill saws are preferred of great thickness and strength, and as it becomes scarce and valuable more regard is paid to the saving effected by thin webs. Portable saw mills have been introduced of late years to some extent, worked either by horse power or by steam engines on wheels. They have the advantage of being easily transported from place to place wherever logs are abundant.—The most complete treatise upon the saw is contained in Holtzapffel's "Mechanical Manipulations," vol. ii.

SAW FISH, a cartilaginous fish of the genus *pristis* (Lath.), the type of a family intermediate in position between the sharks and rays, though generally ranked with the latter. It has the elongated and rounded form of a shark, with the mouth and gill openings on the ventral surface as in rays. Its distinguishing character is the long, flattened, narrow, and straight snout, set on the sides with teeth or strong bony spines, forming a double-edged saw-like weapon, whence the common name. The true jaw teeth are very small, and pavement-like as in the rays; the body is flattened in front of the pectorals, the posterior portion and the tail as in sharks; the skin is covered with small rough scales; the pectorals are distant from the head, and not extending to the ventrals; the tail has 2 dorsals, and a caudal fin prolonged as in the sharks. About half a dozen species are described, found in arctic, tropical, and antarctic seas, and one all along the coast

of the United States from New England to Florida; they are rapid swimmers, and are usually met with far from land, but in many places, as in E. Florida, they are numerous near the shore. The beak with which all are armed attains a length of from  $\frac{1}{4}$  to  $\frac{1}{2}$  the total length of the body; it is covered with a rough skin, and is narrower toward the end, which is not sharp but rounded; this renders still more apparent the great strength of the fish, whose beak, like that of the sword fish, has been found driven deeply into the timbers of ships, which it probably had mistaken for the body of a whale; they seem to have a natural antipathy to the larger cetaceans, and many voyagers have been witnesses to their victories over them. The jaw teeth are adapted for crushing crustaceans and similar animals upon which they feed, and not for tearing flesh. According to Owen, the beak is composed of the cartilages attached to the frontal, nasal, and vomerine bones blended into a horizontal flattened plate, which is more completely ossified than any other part of the skeleton; a series of deep sockets on each of the lateral margins contains the teeth, which are solid, the base being slightly concave and porous, and the spaces between them hollow and filled with a gelatinous medulla, rendering it light without diminishing its strength; vessels and nerves supply the teeth, which grow by constant addition of ossified pulp material at the base. Though the projections of the beak are implanted like teeth, they have no relation to the intestinal canal, and are turned outward like spines of the external or dermoskeleton; they form a very interesting transition between teeth and cutaneous spines. In the osseous sword fish the similarly situated beak is formed by the confluent intermaxillary bones firmly articulated to the prenasals and maxillaries; and these parts are doubtless homologous in the saw fish. These teeth wound by repeated blows, and not by cutting longitudinally like a saw; the Polynesians use this beak as a sword, and it makes a very formidable weapon.—The common saw fish is the *P. antiquorum* (Lath.), which attains a length of 12 to 15 feet, of which the beak is about  $\frac{1}{4}$ , with 20 to 30 teeth on each side; it is blackish gray above, and lighter below; the eyes are large; the nostrils in front of the mouth protected by a membranous fold, and 2 oval foramina behind the eyes. Klein says that in the embryo the sides of the snout are as smooth as the gums of a new-born infant; but according to Latham they grow very rapidly after birth, and are not shed and replaced like the teeth of mammalian jaws. The older writers from Pliny to Gesner have given the most marvellous stories about this fish, such as its being as large as a whale, and able to cut a ship in two in order to devour the crew. Latham describes 4 other species: the *P. pectinatus*, with rostral teeth narrower, and as many as 34 on each side; *P. cuspidatus*, with lancet-shaped teeth, but fewer in

number; *P. microdon*, with teeth hardly projecting beyond the beak; and *P. cirratus*, a native of the Australian seas, with small teeth between the larger, a long barbel on each side of the middle of the snout, and 4 instead of 5 branchial openings. A species, the *P. Perotteti*, from the Senegal, is said to be confined to fresh water.

SAW FLY, the popular name of the *tenthredinidae*, a very destructive family of hymenopterous insects, so named from the saw-like apparatus with which the females are supplied for the purpose of depositing their eggs in a suitable vegetable nidus. They are found on the leaves of plants, and live almost entirely on vegetable food; they are poor fliers, and sluggish in their motions; the form is generally short and flattened, with broad head, and thorax widely joined to the abdomen, the antennæ short but of various forms, thread-like, knobbed at the end, feathered, notched, or forked; the wings overlap, cover the back, and are horizontal when closed. The females have 2 saws, lodged in a groove in the hind part of the body within 2 sheath-like pieces; they are placed side by side, with the ends directed backward, the form and the shape of the teeth varying; they usually curve upward, and are serrated along the lower or convex edges; each saw has a back to steady it, but the blade slides forward and backward on it; they are not only toothed on the edge but on the sides, acting as rasps as well as saws. With these they saw slits in stems, leaves, and fruits, in which their eggs are deposited; the wounds sometimes produce galls in which the young are hatched and grow. The larvæ look much like caterpillars, are of a cylindrical form and greenish color, with several pairs of legs, generally 18 to 22; most are naked, but some have a few prickles, others a white flaky substance, and a few a dark, slimy, slug-like skin. The larvæ also resemble caterpillars in habits; when fully grown they enter the ground and make a silken cocoon, but a few place their cocoons on plants or in crevices above ground; they remain thus during the winter, change to whitish chrysalids in spring, and soon come out winged insects; there are sometimes 2 broods, one going through all its changes during summer. —There are about 100 species found in New England alone. The largest is the elm saw fly (*cimbex ulmi*, Peck), about  $\frac{3}{4}$  of an inch long, with an expanse of wings of nearly 2 inches; the female resembles a hornet, with black head and thorax, hind body steel-blue with 3 or 4 yellowish spots on each side, and smoky brown transparent wings. The male is very different, and is the *C. Americana* (Leach); the body is longer and narrower, without the spots on the sides. They appear from the last of May to the middle of June, the eggs being deposited on the American elm, whose leaves are eaten by the larvæ; these in August are nearly 2 inches long, thick-bodied, with 22 legs, rough skin, pale greenish yellow, with numerous

transverse wrinkles and black dorsal stripe and spiracles; when at rest they lie on the side in a spiral, and eject a watery fluid from lateral pores when disturbed; they make a tough cocoon under dead leaves, in which they remain all winter, being transformed to chrysalids in spring. The fir saw fly (*lophyrus abietis*, Harris) is very destructive in the larva state to the fir family in New England. The male is about  $\frac{1}{2}$  of an inch long and  $\frac{3}{4}$  in expanse of wings; black above, below brown, the wings with changeable tints of reddish, green, and yellow; the legs dirty yellow; antennæ like short black feathers curled inward on each edge. The female is  $\frac{3}{8}$  of an inch long and  $\frac{1}{2}$  inch in expanse; yellowish brown above, with blackish stripe on each side of thorax; dirty yellow below; antennæ short and tapering, 19-jointed, serrated on the outside. They appear early in May, making slits for their eggs in the edges of the leaves; the larvæ come out in June and July, living in large swarms, curling the hind part of the body around the leaf while feeding, and throwing up the head and tail when disturbed; they are about  $\frac{1}{4}$  inch long, the head and anterior parts black; body pale green with longitudinal stripes; below yellowish; they become almost yellow at last, and descend to the ground, where they make oblong grayish cocoons,  $\frac{1}{8}$  of an inch long, escaping in the spring by a lid at one end. The most effective means of destroying them is showering the trees with soap suds or a solution of whale oil soap. A nearly allied species (*L. pini*, Latr.) is very destructive to the pine and fir in Europe; the eggs are laid in slits in the leaves closed up by a viscid substance which issues from the mouth; the larvæ are very voracious, and whole forests in Germany have been stripped by them; among their enemies are insectivorous birds and mammals, like the woodpeckers, mice, and squirrels, and also ichneumon flies. The *L. rufus* (Latr.) is often equally destructive. —The vine saw fly of the United States (*selandria vitis*, Harris) is black, with red thorax above, and fore legs and under side of all the legs yellowish white; wings smoky; the female  $\frac{1}{2}$  of an inch long, the male smaller. They lay eggs in the spring on the lower side of the terminal leaves of the vine, the larvæ appearing in little swarms in July, feeding in company and eating the leaves even to the stalk; they are  $\frac{1}{4}$  of an inch long when full-grown, the head and tip of tail black, the body light green above with 2 rows of black dots on each ring, and yellowish below; they make cells of earth lined with silk, and come out perfect insects in about 2 weeks, when they lay eggs for a second brood, which eat, go into the ground for the winter, and come out flies the next spring. The best remedies are dusting air-slacked lime on the vines or showering them with strong soap suds. Gooseberry and similar bushes are infested by an allied species in Great Britain. The rose saw fly (*S. rosa*, Harris) is shining black, with white

on the legs and smoky wings; the female is  $\frac{1}{2}$  of an inch long, the male somewhat less. They appear from the middle of May to the middle of June, the males being much more active than the females; a single egg is laid in each incision in the leaf, and the larvæ come out in 10 to 15 days; their body is green above, paler on the sides, and yellowish below and on the head; they are gelatinous and sluggish, and eat the upper surface of the leaf in large irregular patches, leaving the veins and skin beneath untouched; they are sometimes so thick that the entire foliage is devoured, looking as if scorched; they burrow an inch or so into the earth, and make a small oval cell lined with silk; they come forth in August, lay eggs for a second brood, which continue the work of destruction in autumn, and remain in their earthen cells all winter. The best remedies are showering the plants with weak tobacco water, dusting them with lime when wet with dew, or watering them with a solution of whale oil soap, 2 lbs. to 15 gallons. Another saw fly injurious to fruit trees will be noticed under *SLUG WORM*.—These insects depart widely from the typical hymenoptera; their motions are sluggish; their jaws are intermediate between those of predacious and honey-eating tribes; they live but a short time in the perfect state, feeding on pollen, the tender parts of leaves, and sometimes plant lice and similar soft-bodied insects; in their stiff upper wings and heavy flight they resemble beetles, being, in the words of Harris, the beetles of the hymenoptera; the resemblance of the larvæ to caterpillars in form and habits shows an affinity to the lepidoptera.

SAWYER, THOMAS JEFFERSON, D.D., an American clergyman, born in Reading, Windsor co., Vt., Jan. 9, 1804. He was graduated at Middlebury college in 1829, studied for the ministry under the Rev. W. S. Balch of Vermont, and in 1880 assumed the charge of a Universalist society in New York. In 1845 he became the principal of the Clinton liberal institute, Oneida co., N. Y., and, in addition to his labors in the school, taught classes in theology. In 1852 he returned to New York to resume the charge of his former society, and soon afterward held a public debate with the Rev. Isaac Westcott, a Baptist clergyman, which was published under the title, "Discussion of the Doctrine of Universal Salvation" (12mo., New York, 1854). In 1861 he took up his residence on a farm at Clinton. Dr. Sawyer has declined invitations to the presidency of Tufts college, Mass., St. Lawrence university, N. Y., and Lombard university, Ill. While at Clinton he was instrumental in calling together the education convention which resulted in the establishment of Tufts college, and he was also efficient in founding the theological school at Canton, N. Y. He has been a very frequent contributor to the periodicals of his denomination. Harvard university conferred upon him the degree of D.D., and the Leipsic theologi-

cal historical society has made him one of its members.—CAROLINE M. (FISHER), an American poetess and authoress, wife of the preceding, born in Newton, Mass., Dec. 8, 1812. She has contributed to the Boston "Evening Gazette," the "Christian Messenger," and other journals; and her articles written while editor of the youth's department of the "Messenger" were collected into a series of volumes for Sunday schools and the general reading of children. She has edited the "Rose of Sharon," a Universalist annual, and is now (1861) editor of the "Ladies' Repository." Her translations from the French and German have been numerous, and she has published many poems, of which no complete collection has yet been made.

SAXE, JOHN GODFREY, an American poet and journalist, born in Highgate, Franklin co., Vt., June 2, 1816. He was graduated at Middlebury college, Vt., in 1839; was admitted to the bar at St. Albans in 1843, and practised law in his native county until March, 1850, when, removing to Burlington, Vt. (where he still resides), he purchased the "Burlington Sentinel" newspaper, which he conducted for 5 years. He has repeatedly been the democratic candidate for the office of governor, and in 1851 was elected state's attorney. At the end of his term of office he took leave of the bar and devoted himself wholly to literature and lecturing. His earliest poems were published in the "Knickerbocker Magazine" in 1843; but his first poetical essay which attracted much attention was "Progress, a Satire" (New York, 1846), which passed through several editions. His next poems were the "New Rape of the Lock" and "The Proud Miss McBride" (1848). In 1849 a collection of his poems was published in Boston. "The Money King and other Poems" appeared in 1859.

SAXE, MAURICE, count, a marshal of France, born in Dresden, Oct. 19, 1696, died at Chambord, Nov. 30, 1750. He was the natural son of Augustus I. (II.), elector of Saxony and king of Poland, by the Swedish countess of Kœnigsmark, and at 12 years of age served in the army of the allies commanded by Marlborough and Eugene. He was present at the sieges of Tournay and Mons and the battle of Malplaquet, and before the age of 15 was placed by his father in command of a regiment of cavalry, with which he did good service at the siege of Stralsund. He fought under Eugene against the Turks in 1717-'18, and repairing to Paris in 1720 received from the duke of Orleans the commission of *maréchal-de-camp* with the command of a regiment, which he proceeded to discipline and manœuvre according to a system of his own invention. For several years he devoted himself to the study of mathematics and the art of war under Folard, and in 1726 proceeded to the north in the hope of being elected duke of Courland. His design was favored by the duchess Anna Ivanovna, widow of the late duke and niece of Peter the Great;

but the opposition of Russia and Poland compelled him to take refuge in France, notwithstanding he had secured his election. In 1728 he was recalled by the duchess, who had conceived an attachment for him, and with whom he might have shared the throne of Russia, to which in 1730 she was elevated, had not his inconstancy caused his dismissal. Upon the declaration of war between France and Austria in 1733, he obtained a command in the French army under the duke of Berwick, and for eminent services at the siege of Philippsburg was appointed a lieutenant-general. In the general war which broke out in 1740 he served with credit in the campaigns in Bohemia and on the Rhine, and in 1743 was appointed a marshal of France. In 1744, at the head of an army in Flanders, he held his ground against forces thrice as numerous as his own, retaining all the conquests previously made by the French; and in the following year he was appointed general-in-chief of the army in Flanders, amounting to 100,000 men. The campaign commenced with the siege of Tournay, and upon the approach of the allies under the duke of Cumberland to the support of the town, Saxe gave them battle at Fontenoy (May 11, 1745), and after an obstinate contest gained a memorable victory, which led to the speedy conquest of all Belgium. On this occasion, though suffering so severely from an attack of the dropsy as to be obliged to travel in a litter, he caused himself to be conveyed to all parts of the field, and superintended in person the operations of the day. For the victory gained at Raucoux over the allies under Charles of Lorraine, Oct. 11, 1746, he was made marshal-general of France; and Louis XV. bestowed upon him the estates of Chambord, which yielded an annual revenue of 100,000 francs. In the campaigns of 1747-'8 Saxe sustained his reputation by the capture of Laffeld, Bergen-op-Zoom, and Maestricht, and other successes, which led to the peace of Aix la Chapelle in 1748. He passed the rest of his life in princely style on his estate. Saxe was one of the ablest generals of his age, and possessed immense bodily strength; he died prematurely from the effects of debauchery. He devoted a number of years of his life to a work entitled *Mes rêveries* (5 vols. 4to., 1757), containing many useful hints on the art of war.

SAXE-ALTENBURG. See ALTENBURG.

SAXE-COBURG, and SAXE-COBURG-GOTHA. See COBURG.

SAXE-MEININGEN-HILDBURGHAUSEN, a duchy of central Germany, composed of the old duchy of Meiningen, the principalities of Hildburghausen and Saalfeld, and some smaller districts; area, 914 sq. m.; pop. in 1858, 168,816, nearly all Protestants. Its surface is mountainous, having on the E. ridges of the Frankensteinwald, on the N. of the Thüringerwald, and on the W. of the Rhöngebirge. Among the highest peaks are the Bletzberg, 2,760 feet high, the Kieferle, 2,598 feet, and the Gerberstein, 2,148 feet. The Werra traverses the duchy,

first in a W. and then in a N. W. direction, and the other principal rivers are the Saale, Ilm, Rodach, Milz, and Steinach. Near Liebenstein and Salzinigen are mineral springs, and salt springs near Friedrichshall and Neusulza. The valleys are fertile. The manufactures consist principally of coarse cottons and linens, iron ware, pottery, and glass. The reigning duke Bernard (born Dec. 17, 1800) succeeded his father in 1803. The government is limited in its functions by a diet of a single chamber. As the 17th member in the Germanic confederation, it has one vote in the *plenium*, and shares the 12th vote with the other Saxon duchies in the executive committee. The federal contingent amounts to 1,726 men. The public revenue for the year 1858-'9 was 1,868,922 florins, and the expenditures 1,666,883. For administrative purposes it is divided into 4 circles, Meiningen, Hildburghausen, Sonneberg, and Saalfeld. The principal towns are Meiningen, the capital, on the Werra (pop. 7,000), Saalfeld, Hildburghausen, Pörsneck, Sonneberg, and Eisfeld.

SAXE-WEIMAR-EISENACH, a grand duchy of central Germany, composed of the principalities of Weimar and Eisenach, which are separated by Prussian Saxony and Coburg-Gotha, and of the district of Neustadt, separated from Weimar by Altenburg, and 12 smaller portions; area, 1,402 sq. m.; pop. in 1858, 267,112, of whom 10,600 were Roman Catholics, 1,430 Jews, and the rest Protestants. It is bounded by Prussian Saxony, Altenburg, Reuss, Schwarzburg, Coburg-Gotha, Meiningen, Bavaria, and Hesse-Cassel. It has a diversified surface, and is watered by the Saale, Ilm, Elster, Orla, Unstrut, and Gera in Weimar, and the Werra, Hörsel, Nessa, Ulster, and Fulda in Eisenach. A large portion of the soil is adapted to agriculture, and produces grain, flax, and hemp; but the principal staple is wool. The government is a limited monarchy, hereditary in the male line. The reigning grand duke is Charles Alexander (born June 24, 1818), who succeeded his father in 1858. As 15th member of the Germanic confederation, it has one vote in the *plenium*, and shares the 12th vote in the executive committee with the other Saxon duchies. The annual receipts in 1857-'9 were 1,550,827 thalers, and the expenditures 1,544,239. For administrative purposes it is divided into 5 circles, the 1st and 2d of Weimar, Eisenach, Dermbach, and Neustadt. The chief towns are Weimar, the capital, Jena, Apolda, Neustadt, and Weida.

SAXIFRAGE (*saxifraga*, Linn.), a genus of plants so called from their growing in the cracks of rocks and in stony places. They are low, hardy, and herbaceous, of rich and extensive variety, natives of mountainous tracts and northern parts of the world. The saxifrages hold a close affinity to the rosaceous tribes, and in some instances it is difficult to draw the distinction. The foliage of the genus differs from a thick and succulent to a mossy form, and from a smooth to a hairy surface. The flowers are sometimes solitary, corymbose,

and paniced, usually white, sometimes yellow, flesh-colored or purple, but never blue. The radical leaves are sometimes disposed circularly around the stem near the root, so that the plants have a tendency to become caespitose in their habits. Those species which are found on the Alps constitute the chief beauty of the turf which springs near the snow line; but they are of diminutive size individually. Many of the saxifrages are highly prized in cultivation, and some are subjects of pot culture. In open flower borders the *S. crassifolia* is conspicuous and ornamental on account of its large, thick, vigorous leaves, and handsome rosy blossoms. The London pride or none-so-pretty (*S. umbrosa*) grows wild in the mountains of Britain, and is used as an edging to the most gorgeous flower beds. Its leaves are evergreen, oblong, oval, and produced near the root; its flowers are white spotted with red, and appear from April till June. The creeping saxifrage (*S. sarmentosa*) is well known as an ornamental plant, being employed for growing in suspended baskets of wire, the long stolons or runners hanging gracefully down, each supporting on its extremity a cluster of handsome leaves; the flowers grow on slender tall stalks, and are white and pink. When protected in winter with a few dry leaves, it will be found hardy and fitted for the open border.—There are about 50 North American species, of which the vernal saxifrage (*S. Virginensis*, Mx.) is the most common, appearing early in flower on every sunny and rocky hillside. This sometimes, though rarely, bears perfectly double flowers. The swamp saxifrage (*S. Pennsylvanica*, Linn.) is a more homely species, having large, membranaceous, pale green, slightly ciliate leaves, 4 to 8 inches long, and a stout scape 3 to 4 feet high, with small greenish yellow flowers; it grows in bogs from Canada and the northern states to Ohio, westward.—The saxifrages are typical representatives of the natural order *saxifragaceæ*, which comprises several North American genera of early spring and summer blooming plants, of which the *Sullivantia Ohioensis* of Torrey and Gray, found on the limestone of the West, is perhaps the most interesting and remarkable. The entire order is astringent, the alum root (*Heuchera Americana*) powerfully so. Some are slightly tonic.

SAXO, surnamed GRAMMATICUS on account of his great learning, a Danish historian, died in 1204. He was, according to the common opinion, provost of the cathedral of Roskilde, then the Danish capital, and was employed by Archbishop Absalon to write a history of Denmark. For times near his own, Saxo, in the opinion of the historian Geijer (the best northern authority), is an unexceptionable witness; but in describing more remote periods he drew greedily from popular tradition. His history nevertheless, extending from the earliest period to 1186, is the finest monument of the early ages of Denmark. It is entitled *Historia Regum Heroumque Danorum*, and was first printed in

Paris (fol., 1514). A learned commentary upon this work has been written by Stephens (fol., Sorbæ, 1644).

#### SAXON LANGUAGE AND LITERATURE.

See ANGLO-SAXON LANGUAGE AND LITERATURE.

SAXONS, a name first used by the geographer Ptolemy to indicate a branch of the German or Teutonic race, whose descendants now occupy the kingdom of Saxony, the Lusatian districts of Prussia, the circle of Wittenberg, the old circle of Westphalia, the British islands and colonies, and the United States of America. The Saxones mentioned by Ptolemy were a small Teutonic tribe, who in A. D. 141 dwelt on the north bank of the Elbe, and upon several small islands in the vicinity of the mouth of that river and of the Eider. From their geographical position as far west as the Atlantic coast, it seems probable that they were among the earliest of the Teutonic tribes which passed across from Asia into Europe. Among the numerous Scythian hordes described by Herodotus is the powerful tribe of the Sakai or Sacæ (which was the Persian name for all the Scythians), and the word Saxon is supposed by some modern critics to have been derived from *Sakai-suna*, sons of the Sakai. Eutropius, the next after Ptolemy who mentions them, states that the Saxons, united with the Franks, had become formidable against the Roman frontier. As the strength of the empire declined, that of the German tribes seemed to increase. The exploits of the Saxons were chiefly at sea. Their depredations upon the Roman colonies and commerce were so severely felt, that a special fleet was appointed to act against them, and the southern coast of Britain was placed under an officer styled *comes littoris Saxonici*. Every Roman writer now mentioned them with dread. Carausius, a Belgian, who usurped the purple in A. D. 287, gave them ships, sent officers to teach them the science of navigation, and encouraged their depredations upon every coast which had not acknowledged his authority. Magnentius, who had seized Italy and Gaul, and assassinated the emperor Constans, likewise formed an alliance with them (350); other tribes joined their standard; and at length they gave their name to a powerful league rivalling that of the Franks, and embracing all the tribes between the Skager Rack and the limits of modern France, extending inland to the Saale, and beyond to the western frontier of Bohemia. They established themselves in Britain (see ANGLO-SAXONS), and on the continent attacked the upper Rhine, and extended the scene of their spoils far inland, making Gaul, Italy, and eastern Germany tremble at their approach. Charlemagne at last, after one of the most obstinate and destructive wars recorded in history (772–804), destroyed their aggressive power. (See GERMANY.)

SAXONY (Germ. *Sachsen*), the smallest of the 5 kingdoms belonging to the German confederation, a remnant of the once powerful electorate of Saxony, situated between lat. 50° 10'

and 51° 30' N., and long. 11° 50' and 15° E.; greatest length from E. to W. 140 m., greatest breadth from N. to S. 92 m.; area, 5,758 sq. m.; pop. in 1858, 2,122,148. It is bounded N. and N. E. by Prussia, S. E. and S. by Bohemia, S. W. by Bavaria, and W. by the Saxon duchies and Prussia. The S. portion is traversed by the spurs of the Fichtelgebirge and the Erzgebirge, of which the principal ridge forms the boundary line between Saxony and Bohemia. The picturesque region where the spurs approach the river Elbe is known as Saxon Switzerland. On the right bank of the Elbe the Lusatian mountains form the connecting link between the Erzgebirge and the Riesengebirge. The mountainous region comprises little more than  $\frac{1}{3}$  of the kingdom, the remaining portion being either a dead level or a slightly undulating country. The Elbe, which enters the kingdom from Bohemia, traverses it from S. E. to N. W., a distance in a straight line of 65 m. It is navigable by steamboats of light draught. Its principal tributaries are the Elster, Mulde, and Spree. The climate is wholesome, although somewhat severe in the mountainous region.—The N. W. section contains the most fertile soil, and produces most abundant crops of breadstuffs. Of the 3,634,580 acres which constitute the area of the state, 1,828,477 are under tillage, 103,392 in gardens, 410,108 meadows, 76,388 pasture, 1,125,026 forest (of which 360,216 acres belong to the government), 27,707 lakes and ponds, 4,188 vineyards, 4,244 quarries, and 55,050 waste lands. The total value of all private landed property in 1830 was \$294,000,000, and in 1858 \$490,000,000, an increase of 66 per cent. The mineral production is comparatively large, the mountains abounding in marble, sandstone, porcelain clay, coal and brown coal, silver, iron, lead, tin, arsenic, bismuth, vitriol, and antimony. The quantity of silver annually mined in Saxony averages 40,000 lbs., of iron 180,000 cwt., and of lead 10,000 cwt. The government employs in mining 300 superintendents, clerks, &c., and 12,600 miners and laborers. In 1853 the quantity of silver, lead, copper, nickel, and cobalt obtained from the government mines was 315,137 cwt., and its value \$850,000. The agricultural products are rye, wheat, barley, oats, rapeseed, peas, millet, buckwheat, hops, and all kinds of vegetables and fruit, in the level portion of the state, and oats, potatoes, and flax in the mountainous districts. A great portion of the grain is used for distilling and brewing. In 1858 there were manufactured in 661 distilleries 7,160,004 gallons of whiskey, from 396,000 bushels of grain and 3,510,000 of potatoes. In the same year 695 breweries produced 36,000,000 gallons of beer. The production of wine, which is of the poorest quality, is so unequal that no average can be given, its maximum within the last 30 years having been 1,700,000 gallons in 1834, and its minimum 27,000 gallons in 1838. In 1857 the quantity produced was 378,000 gallons, and in 1858 720,000. Cattle breeding is carried on as a

distinct branch of agricultural industry in the mountainous sections; sheep raising, which was formerly one of the principal interests of Saxony, has greatly decreased in extent, while its value has been increased by improvement of breed. The census of 1858 states the number of horses at 94,840, oxen 63,773, kine and calves 494,299, sheep 378,815, hogs 260,687.—According to the census of Dec. 1858, of the total population 771,268 lived in cities, and 1,350,880 in villages and towns. The number of dwelling houses was 232,454, giving an average of 9.13 inhabitants to each house. The increase of the population from 1834 to 1858 was 526,480, or nearly 33 per cent. The excess of births over deaths during 3 years, from 1853 to 1855 inclusive, was 3.2 per cent.; from 1856 to 1858 inclusive, 3.5. During the same periods the emigration was only 4,209 and 2,094 respectively. The proportion of the sexes was 49.41 males to 50.59 females. There were 1,317 blind, 1,268 deaf mutes, and 5,517 idiots and insane persons. With the exception of about 50,000 Wends and a small number of Jews, the entire population belongs to the pure German stock. Only 1.82 per cent. of the inhabitants are Roman Catholics; 0.08 German Catholics, 0.07 Jews, and 0.20 Calvinists; all the remainder, or 97.80 per cent., belong to the Evangelical (Lutheran) church. Of the 5 principal cities, Dresden, the capital, had in 1858 117,750 inhabitants, Leipsic 74,209, Chemnitz 40,571, Zwickau 17,878, and Freiberg 15,776.—Saxony is, in proportion to its size and population, one of the principal industrial countries of Europe. Its manufacturing establishments number over 55,000, employing full  $\frac{2}{3}$  of the population. The value of the metallic fabrics amounted in 1843 to \$1,500,000, and has probably doubled since then. Tin spoons, and paints manufactured from cobalt ore, are exported in great quantities even to China and Japan, as well as textile fabrics and hosiery. The laces and embroideries of Saxony have maintained their reputation for centuries. Woollen cloth and broadcloth are made equal to the best Netherlands cloths. Merinos and delaines are extensively exported to America. Straw goods are manufactured in great excellence in the valley of the Elbe. The pianos and other musical instruments of Dresden and Leipsic enjoy a wide reputation. The porcelain vies with the very best of France and China. The most important branches of manufacture, lace and linen, have for generations been successfully carried on as domestic pursuits, principally in the mountainous districts; but within the last 20 years steam power has been freely applied to manufacturing purposes. The number of stationary steam engines has increased from 197 with 2,455 horse power in 1846, to 550 with 7,132 horse power in 1856. Of the latter number, 141 engines were employed in mining, 25 in furnaces, 41 in machine shops, 17 in mills, 214 in spinning mills and the manufacture of textile fabrics, and 3 in printing offices. In the same year there were



used 147 locomotives with an aggregate of 9,200 horse power, and 11 steamboat engines with an aggregate of 377 horse power. Leipzig is the great centre of the publishing business, as well as the seat of the most active book trade in central Europe. (See BOOKSELLING.)—The commerce of Saxony is in proportion to the variety and value of its industry. The three annual fairs of Leipzig have ever since the 12th century been the principal marts of exchange between central Europe and the East. The value of goods exchanged at these fairs is estimated at from \$40,000,000 to \$50,000,000 per annum. Numerous railways connecting all the principal cities of the state with the general railway system of Germany, excellent turnpikes, and a well regulated postal establishment, facilitate the commercial intercourse. The kingdom forming a part of the Zollverein, no trustworthy statements of its own commercial movements can be obtained, but its growth may be seen from the increase of the freight carried on the Elbe within the boundaries of Saxony. The amount was 4,848,945 cwt. in 1848, 7,258,520 cwt. in 1853, and 10,015,708 cwt. in 1858. The proportion received by Saxony from the common customs revenue of the Zollverein in 1858 was \$1,753,397. The principal articles of export are woollen and linen goods, books, lace, wool, worsted, cotton prints, toys, mineral products, paints, porcelain, and sandstone; and the articles of import are cotton, silk, flax, hemp, wool, coffee, tea, tobacco, sugar, wine, dried fish, fancy goods, and sometimes breadstuffs, the domestic produce not being always sufficient for home consumption.—Public education is as well provided for in Saxony as in Prussia. The number of common schools is nearly 2,000, including 40 for Roman Catholics and 2 for Jews. In all the cities there are higher common schools (citizens' schools). Of classical colleges (gymnasias) there are 11, of normal schools 11, and of Sunday schools (in 1851) 70, with 7,451 pupils. The university of Leipzig, one of the oldest in Germany, maintains its reputation. Of establishments devoted to special branches of learning there are: a mining academy at Freiberg, an academy of surgery at Dresden, an academy of forest culture at Tharand, a military and artillery school at Dresden, a polytechnic academy at Dresden, 3 technical schools at Chemnitz, Plauen, and Zittau, 5 academies of architecture, 5 commercial academies, a normal school of physical culture, and 2 institutions for deaf mutes. The fine arts are fostered by academies at Dresden and Leipzig, and by excellent picture galleries and museums at the capital. The royal picture gallery contains more gems of art than any other in Europe outside of Italy.—The periodical press of Saxony, so far as political journals are concerned, is insignificant. Only one daily newspaper (*Deutsche allgemeine Zeitung*, Leipzig) ranks with the most prominent of Germany. Of literary periodicals, mostly weeklies, a great number are published at

Leipzig. One of them (*Gartenlaube*) has a circulation of 110,000, the largest ever obtained by any German periodical.—Saxony is, according to the constitution of Sept. 4, 1831, a hereditary, indivisible, constitutional monarchy. As a member of the German confederacy it holds the 4th rank, and in a full diet casts 4 votes. The legislature consists of 2 chambers. The administration is divided into 6 departments (ministries of justice, of finance, of the interior, of public worship, of public education, and of foreign affairs), the heads of which constitute the ministry of state. A council of state which stands between the ministry and the king has merely advisory powers in the preparatory stages of legislation. The established church (Evangelical) is governed by a board consisting of the minister of public worship and at least two other members of the ministry of state, independently of the king, the royal family belonging to the Roman Catholic church. The state is divided into 4 principal districts, viz., Dresden, Leipzig, Zwickau, and Bautzen, and subdivided into departments or bailiwicks (*Amtshauptmannschaften*). Justice is administered by 32 district courts and 82 circuit courts. The revenue of the kingdom from all sources was set down for each of the years 1858-'59-'60 at 9,365,243 thalers (the thaler being equal to 72.2 cts.), and the expenditure at the same sum, including a reserve of 147,331 thalers. In 1859 the receipts and expenditures were fixed by the diet at 11,203,540 thalers. The public debt at the close of 1859 amounted to 63,687,725 thalers, including 7,000,000 of government paper money. The army numbers 25,396 combatants, exclusive of the reserve force, and 1,232 non-combatants. The infantry consists of 4 brigades of the line (15,748 officers and men) and 1 brigade of riflemen (4,005 officers and men). The cavalry is 3,208 strong, divided into 4 regiments; the artillery comprises 2,420 officers and men. The quota of Saxony to the federal army is 12,000 men, forming the 1st division of the 9th army corps. The only fortress of the country is the absolutely impregnable Königstein (King's Rock), a castle built upon a cliff, whose sides for a distance of 900 feet are almost as perpendicular as a wall.—The territory of the present kingdom of Saxony was conquered from the aboriginal tribes (Hermunduri and Sorabians) by the Germans during the 9th and 10th centuries, and became a portion of the margraviate of Meissen (established A. D. 928), which in the 12th century was one of the most flourishing states of Germany. Industry and commerce were vigorously developed, and Leipzig became famous as a commercial emporium. During the 13th century the country was the prey of contending dynasties, until in 1308 the margrave Frederick succeeded in uniting Meissen and the landgraviate of Thuringia under his rule. At a later period a portion of Franconia was added to the country, which, having become one of the greatest states in Germany, was raised to

the rank of an electorate in 1423. In 1482 it was divided between Ernest and Albert, the former taking Saxony proper as an electorate, the latter Thuringia. Ernest's sons, Frederic, surnamed the Wise (1486-1525), and John, surnamed the Constant (1525-'32), were the powerful protectors of Luther. But the son of John, John Frederic, while struggling for the cause of Protestantism, succumbed to an alliance between his cousin Maurice, of the Albertine line, and the emperor Charles V. Maurice succeeded to the electorate, which has ever since remained with his dynasty. Among his successors, John George I. (1611-'56), by his vacillating policy during the 30 years' war, plunged his country into the deepest misery and desolation. (Frederic) Augustus I. (II.), surnamed the Strong (1694-1733), became a convert to the Roman Catholic faith (1697), and was then elected king of Poland. That country having by him become involved in war with Charles XII. of Sweden, Saxony was invaded by the Swedes and suffered greatly. The extravagance and profligacy of his son Augustus II. (III.) (1733-'63), and the wars with Prussia, especially the calamitous 7 years' war, impoverished and demoralized the country. The regent Xaver (1763-'8) and Frederic Augustus (1768-1827), by their wise and economical administration, succeeded in raising Saxony from the degradation into which it had been dragged by their predecessors. The administration of justice was thoroughly reformed, and public education provided for. In 1791 Frederic Augustus declined the crown of Poland. As a member of the German empire he took part in the war against revolutionary France (1793-'6). In 1806 Prussia compelled him to side with her against Napoleon. Prussia having been overthrown by the battle of Jena, Napoleon transformed the electorate into a sovereign kingdom and a member of the Rhenish league. In 1807 the grand duchy of Warsaw was added to the kingdom. After the failure of Napoleon's Russian campaign, Frederic Augustus made an unsuccessful effort to withdraw from the French vassalage, but Napoleon compelled him to share his fate. The battle of Leipsic having destroyed Napoleon's authority in Germany, the king of Saxony was declared a prisoner of the allies, and the kingdom was governed by Russian and Prussian commissaries. By the treaty of Vienna (May 18, 1815), 7,765 square miles of territory, with 864,305 inhabitants, were wrested from Saxony and given to Prussia, reducing the former to its present size. Frederic Augustus, who continued to rule in a mild, patriarchal manner, was succeeded by his brother Anthony (1827-'36), during whose reign a constitution was granted and the entire legislation of the kingdom thoroughly reformed. In 1834 Saxony entered the Zollverein. The reign of Frederic Augustus II. (1836-'54) was disturbed by violent religious animosities, culminating (Aug. 12, 1845) in a bloody riot at Leipsic, by the

revolution of 1848, and by a sanguinary struggle of the national democratic party for the recognition of the national constitution of Germany (May, 1849). The king became a tool in the hands of a reactionary party, led by his brother John, who succeeded him, Aug. 9, 1854.

SAXONY (Germ. *Sachsen*), a province of Prussia, bounded by Brandenburg, Anhalt, the kingdom of Saxony, the Saxon duchies, Hesse-Cassel, Hanover, and Brunswick; area, 9,788 sq. m.; pop. in 1858, 1,910,062. It has a generally flat surface, but in the S. are the Thuringian mountains, and in the W. the Hartz mountains, whose highest peak, the Brocken, is within the province. The eastern portion is intersected by the river Elbe, which enters near the S. E. corner, and flows N. W. All the other streams, of which the Saale, Mulde, Unstrut, Bode, Havel, and Jeetze are the principal, are tributaries to the Elbe. The soil is generally fertile and the best cultivated in Prussia, and the climate is mild and healthful. Wool, potatoes, and grain are the principal productions. There are many manufactories of cotton and woollen cloth, leather, linen, sugar, tobacco, and beer. Until 1815 most of this province belonged to the kingdom of Saxony, but it was ceded to Prussia by the congress of Vienna. It is divided into 3 circles, Magdeburg, Merseburg, and Erfurt.

SAY, JEAN BAPTISTE, a French political economist, born in Lyons, Jan. 5, 1767, died in Paris, Nov. 16, 1832. Having been attracted toward the study of political economy by reading the works of Adam Smith, he gave up the commercial pursuits in which he had been engaged, resolved to devote himself to letters, became connected with the *Courrier de Provence*, a newspaper edited by Mirabeau in Paris, and afterward was the secretary of Clavières, the Girondist minister of finance. In 1794, in conjunction with Ohamfort, Andrieux, and Ginguéné, he commenced a periodical entitled *La décade philosophique, littéraire et politique*; and after the 18th Brumaire he was appointed a member of the tribunate. In the mean time he wrote his *Traité d'économie politique* (2 vols. 8vo., Paris, 1808), which has become a standard work. Having been forced by Bonaparte to withdraw from political life, he established a large cotton-spinning mill, but was obliged to abandon it in 1812. After the fall of Napoleon he published an improved edition of his *Traité de l'économie politique*, to which he added an *Épître des principes fondamentaux de l'économie politique*. In 1815 he prepared a *Catéchisme d'économie politique*. The Paris *Athénée*, a private association for the diffusion of science and literature, invited him to deliver at their rooms lectures on political economy; and in 1821 he was appointed professor of industrial economy, in the *conservatoire des arts et métiers*, and in 1830 professor of political economy in the college of France. His lectures at both these institutions were published under the title of *Cours complet d'écon-*

*omie politique pratique* (6 vols. 8vo., Paris, 1828-30). He also wrote *Lettres à M. Malthus sur différents sujets d'économie politique* (Paris, 1820), reprinted under the title of *Mélanges et correspondances d'économie politique* (1833), and various essays which have been collected in his *Œuvres diverses*. His *Traité* and *Catéchisme* have each been twice translated into English. (See POLITICAL ECONOMY, vol. xiii. p. 451.)—HORACE ÉMILE, a political economist, son of the preceding, born at Noisy, near Paris, March 11, 1794. He was educated at Geneva, came to the United States in 1813 as supercargo, and in 1815 went to Brazil, where he remained 10 years, and since his return to France has filled various municipal and state offices. He has published several treatises on matters connected with commerce and political economy, one of the most noteworthy of which is his *Études sur l'administration de la ville de Paris et du département de la Seine* (8vo., Paris, 1846). He was one of the founders of the *Journal des économistes* (1842), with which he is still connected.

SAY, THOMAS, an American naturalist, born in Philadelphia, July 27, 1787, died at New Harmony, Ind., Oct. 10, 1834. In 1812 he was one of the founders of the academy of natural sciences in Philadelphia. In 1815 he spent some months in E. Florida investigating the natural history of that region; in 1819 he was appointed chief zoologist in Long's expedition to the Rocky mountains, and in 1823 accompanied that to St. Peter's river in the same capacity. He removed to New Harmony in 1825, and spent the remainder of his life in the preparation of an American entomology beautifully illustrated, of which he had published 2 volumes before leaving Philadelphia, and of an American conchology. His complete writings on entomology were edited by Dr. J. L. Le Conte, with a memoir by George Ord (New York, 1859), and his work on conchology by W. G. Birney (New York, 1858).

SCABBARD FISH, a fish generally placed with the mackerel family, and in the genus *lepidopus* (Cuv.), differing however from typical scomberoids in having a single, long, continuous spinous dorsal, with no scaly armor on the lateral line, no corslet of enlarged scales on the thorax, and no keel on the side of the tail; most of the rays of the anal are reduced to small spines; the teeth are pointed and cutting, the anterior ones the longest. The only species described is the *L. argyreus* (Cuv. and Val.), inhabiting the European seas from Great Britain to the Mediterranean, and met with even as far south as the cape of Good Hope. The body is very elongated, compressed, and ribbon shaped, and without scales; the head is pointed; the dorsal, anal, and caudal fins distinct from each other, the first extending the whole length of the body; the jaw teeth are in a single row, those on the palate and pharyngeal bones and branchial arches very small. In a specimen taken on the coast of

England, between 5 and 6 feet long, the body was only 4½ inches deep at the gills, 2 at the beginning of the anal and at the tail, with a weight of 6 lbs. without the intestines; the pectorals were rather small, and the ventrals a mere squamous appendage, the styloid pubic bone being felt through the skin; 6 branchiostegal rays, a long cæcal stomach, numerous pancreatic cæca, and a narrow air bladder. Though not an uncommon fish in European seas, it was not known to naturalists until the end of the 18th century; it was described by Montagu as *xiphotheca tetradens*, the specific name being derived from the 4 (sometimes 6) elongated teeth in front; according to Risso its flesh is eaten in Mediterranean ports, and is firm and delicate. It swims with great velocity, waving through the water like a long and wide ribbon of silver, displaying the most beautiful reflections with the change of light; it often swims with the head and anterior part of the body above water, and no doubt, when seen dimly and at a distance, has given rise to many of the stories of small sea serpents.—Another of the aberrant scomberoids, which may be mentioned here, is the silvery hair-tail (*trichiurus lepturus*, Linn.; *T. argenteus*, Mitch.). It differs from the preceding genus in having no vestige of ventrals, in the anal being a series of spines scarcely protruding through the skin, and in the tail ending in a filiform point without a caudal fin, whence the name. It attains a length of 4 feet, and sometimes, it is believed, is much longer; it is found on the American coast from New England to South America, and has been cast ashore on the coast of England; it is silvery, with a golden lateral line and grayish yellow dorsal; the lower jaw is the longer, with 2 teeth projecting beyond the upper when the mouth is closed; the anterior teeth are compressed and notched, and the whole armature of the jaws indicates carnivorous habits; the anterior border of the upper jaw is formed wholly by the intermaxillaries. Other species are described in the Indian ocean. Both of these genera, which some authors think do not belong among the scomberoids, are occasionally called ribbon fish.

SCÆVOLA, the cognomen of several Romans, the most distinguished of whom were the following: I. CAIUS MUCIUS, a legendary hero, who flourished at the close of the 6th century B. C. Porsena of Clusium, the protector of the expelled Tarquins, having besieged Rome and reduced the city to great distress, Mucius, concealing a dagger beneath his robe, proceeded to the hostile camp, where, mistaking the chief secretary for the monarch, he struck him a fatal blow. On being seized by the guards and dragged before Porsena, he avowed himself a Roman, and declared that his object was to assassinate the king, a deed which other Romans would still achieve, whereupon Porsena ordered him to be instantly burned alive, unless he disclosed what he knew about his fellow conspirators. Mucius, to convince the Etruscan

how little he was dismayed at the prospect of impending tortures, thrust his right hand into a fire that blazed hard by, and held it there unflinching while it was being consumed. Por-sena, astonished at his fortitude, commanded him to be liberated; whereon Mucius, not to be outdone in generosity, informed the king that there were 300 Roman youths who had sworn to free Rome from so dangerous an enemy, or to perish in the attempt. This disclosure had such an effect on the mind of the monarch, that he at once made peace with the Romans; while Mucius, in consequence of the loss of his right hand, was ever after distinguished by the cognomen of Scævola, or the left-handed. II. QUINTUS MUCIUS, the augur, was tribune of the people in 128 B. C., plebeian ædile in 125, prætor in 121, and consul with L. Cæcilius Metellus in 117. He was distinguished by his legal erudition and by his modesty, never hesitating to refer his clients to other lawyers whenever a question came before him which he was conscious that they understood better than himself. He died soon after the outbreak of the civil war between Marius and Sylla. Cicero in his youth was a pupil of this Mucius, whom he makes an interlocutor in several of his dialogues. III. QUINTUS MUCIUS, the pontifex, was tribune of the people in 106 B. C., curule ædile in 104, and consul with L. Licinius Crassus in 95. After his consulship he obtained the province of Asia, where his equitable conduct so gained the esteem of the people, that they instituted a festival in commemoration of his virtues. He fell a victim to the Marian faction in 82, having been slain in the temple of Vesta, whose statue was covered with his blood. He was still more celebrated as a lawyer than his contemporary and namesake. According to Cicero, who had been his pupil, he was the most eloquent of jurists and the most learned of orators. He was the first Roman that composed a scientific and systematic treatise on the *Jus Civile*, now lost; and he was also the author of a work on legal definitions, entitled *Περὶ Ὁρίων*.

SCAGLIOLA (It. *scagliuola*, a scale or chip of marble), an artificial stony preparation, used as an external coating or plaster in various sorts of ornamental work. It is sometimes called *mischia* from the mixture of materials of which it is composed. The design of the preparation is to produce imitations of marbles or other ornamental stones, of such character as to admit of the high polish and lustre of the genuine substances. In Italy the art is carried to great perfection, and its invention is claimed for Guido Fassi, who died in 1649 at Carpi in Modena. He applied it to the execution of cornices and other pieces of architecture. The plaster is composed of finely pulverized calcined gypsum, made into a paste with alum and glue or isinglass. It is laid upon a rough mortar surface, and as it is floated with wooden moulds adapted to the shape of the object, the coloring matters, consisting of ochres, chromes,

&c., designed to imitate the natural colors of the marbles, are introduced. When this is set, the surface is rubbed with pumice stone and cleaned at the same time with a wet sponge, after which it is finely polished. Columns are coated in this manner, made of a wooden framework within and covered around with laths for receiving the mortar and plaster; they are placed in a lathe to be dressed and polished. Skilful workmen thus produce excellent durable imitations of brocatella and any of the veined marbles, and other stones.

SCALD. See BURNS AND SCALDS.

SCALDS, or SKALDS, the national poets and historiographers of the early Scandinavian monarchs. For a long period after the introduction of Christianity they maintained their place at the courts of the northern kings, and in most cases were natives of Iceland, whom the historian Geijer calls a nation of song writers. The origin of their art is ascribed to Odin; but as a purer faith spread over the north, it assumed a more artificial character, and at the same time a more useful one. The songs of the scalds were committed to memory and carefully preserved. They were chanted at feasts and public assemblies, and are the foundation of the elder sagas. The *Skalda*, a manual for the use of apprentice poets, is supposed to have been written by Olaf Thordson in the 12th century. The scalds held a sacred and important character, and often performed the office of ambassadors. Their emoluments and rewards corresponded with the dignity of their station, and they often married the daughters of princes. A list of the most celebrated scalds has been preserved, beginning as early as the year 825; among them are several crowned heads and distinguished warriors.

SCALE (Lat. *scala*, a ladder), a graduated line or slip of wood, ivory, metal, or paper, divided into parts equal or unequal, according to the purposes they are to serve, and used for transferring these parts by dividers in plotting. The most simple scale is that of equal parts, and this may serve not merely for giving proportional linear spaces, but also for laying down angles with greater accuracy, the table of chords being referred to to give the proportional length of the chord of any angle to the radius of the circle. The common 6-inch ivory scale contains a number of scales, each of which presents a different division of the inch, as into quarters, and one of these into tenths, and each tenth by what is known as the diagonal scale into 10 parts; other divisions are into 3, 3½, 4, 4½, 5, and 6 equal parts, and one of each of these being divided into 10, divisions 10 times more minute than those named are obtained. One of each of the principal divisions is also marked into twelfths, so that the larger division being taken to represent a foot, the subdivisions represent inches; and thus plans may be plotted of any of the several scales in feet and inches. These scales are also sometimes furnished with trigonometrical lines, as

scales of chords, rhumbs, sines, secants, and tangents. (See GUNTHER, and SECTOR.) Scales of equal parts have of late been produced in a very convenient and cheap form upon paper, the divisions being of 12 inches, and a 13th inch which is divided into 20, 40, 50, and 60 equal parts. Different divisions are furnished by other scales.

SCALE INSECT. See MEALY BUG.

SCALES. See COMPARATIVE ANATOMY.

SCALES, an apparatus by which things are weighed. The principles upon which scales are constructed, and descriptions of several varieties, are given in the article BALANCE. Under the present head will be presented an account of some of the largest forms of scales, known also as weighing machines. Until the year 1830 the only apparatus in use throughout the United States for weighing heavy bodies was either the scale beam or steelyard, to the arm of which the body to be weighed was suspended. In each town it was common to see a tall narrow building open at the two sides devoted to what was called the town scales, in which under certain regulations heavy articles might be weighed. What with the usual clumsiness of the apparatus and the uncertainty of the weights employed, the results could have little pretension to accuracy. In England, what are now known as platform scales were in use previous to the year 1796, when a patent for an improvement was granted to a Mr. Salmon. They were placed at the turnpike gates of the principal roads, and loaded wagons, which paid toll according to their weight, were driven upon them and weighed precisely as at the present time. On the introduction of railroads, however, the weighing machines most in use in Great Britain appear to have been forms of the steelyard furnished with a succession of levers. The steelyard is still a very convenient portable weighing machine, especially in that form of it known as Dearborn's beam, in which the short arm exactly counterpoises the long arm, and which is most easily used in a light portable frame, suspended under the middle of its beam, and lifted together with its load by means of a bent lever upon the top of this beam. The principle of the platform scales consists in supporting a platform upon a system of 4 horizontal levers, which are placed in a shallow portable box or in a pit in the ground. These levers are iron bars set on edge, and each hinging upon a fixed knife edge of steel in one of the corners of the box or pit. On the original plan they all met under the centre of the platform, their ends resting on the short arm of a 5th lever, also of the 2d order, the long arm of which extended beyond the margin of the platform, and was suspended by means of a connecting rod to the short arm of a lever or index beam at a convenient height above the ground. This in all the scales receives the counterpoise and the weights. The platform was fitted to the box or to a recess around the edge of the pit, resting there when not in use. Near each

corner a foot projected downward terminating in a steel plate, and as the levers were raised a very little by the depression of the index beam, a knife edge fixed to each of them near the fulcrum reached this plate and together lifted the platform and its load. The weight, it is seen, was thus divided between the 4 levers, resting upon them between their fulcrums and the power, and several times nearer to the former than to the latter. Such proportion of the load was therefore borne by the 4 corners, relieving the scale beam of this, as the length of the long arm of one of the levers to its whole length. The scale beam was still further relieved by the 5th lever, which was of the same order as the others, and received the weight a little within its fulcrum, which also worked upon a knife edge. In the scales of more recent construction the 5th lever is done away with, and two from the corners and at one end of the box or pit are extended entirely across, meeting each other beyond the opposite end and directly under the scale beam with which they connect. The other two levers meet the first pair and connect, one with each of them, just midway across. A steel ring at this point hangs upon a knife edge of each of the levers of the first pair, and into this is introduced the knife edge facing downward of one of the other levers. The adjustment of the bearing points is made with the utmost precision, so that the results do not vary if the load is placed successively upon different portions of the platform. Considering the small proportions of the load that actually comes upon the scale beam to be weighed, in the largest machines sometimes amounting to not more than the  $\frac{1}{100}$  or even the  $\frac{1}{1000}$  part, the results are surprisingly accurate. At a test made in the crystal palace, New York, 52,600 lbs. was weighed successively on every portion of the platform of a railroad track scale, and the greatest variation from the mean weight was 3 lbs. The graduation of the beam is made very exact by machine work, and all the corresponding parts in the scales of the same size are interchangeable. In some of the scales the platforms are now allowed to rest constantly upon the knife edge, and a second platform is added resting on the first with disks of India rubber between. A stop is applied to the scale beam which prevents any movement of the levers until this is released. Less injury, it is found, results to the knife edge by this arrangement than by leaving to the workmen to put the scales in bearing with each weighing. One very important result attendant upon the introduction of these scales throughout the United States has been the establishment of a uniform standard and the correction of the faulty weights previously in use in several important cities, as Baltimore and Louisville. The machines are constructed in works of great extent at St. Johnsbury, Vt., in New York, and various other places, and of all sizes, from those adapted for the use of families, grocers, and

druggists, that may be placed upon a table, up to those of a capacity of 200 to 500 tons, used in the weigh-locks of canals for weighing loaded boats. The railroad track scales have a capacity of from 20 to 150 tons, and the length of their platform is sometimes 112 feet. Some of the portable scales are on wheels. For the West India islands some are provided with Spanish, Dutch, and French weights.

SCALIGER, JULIUS CÆSAR, an Italian philologist, born April 23, 1484, died in Agen, France, Oct. 21, 1558. According to his own account, he was descended from the family of Della Scala or Scaligeri, sovereign princes of Verona from 1260 to 1367, and was born in the castle of Riva near the lake of Garda, served with distinction in the army of the emperor Maximilian I., and commenced his classical and medical studies when he was between 30 and 40 years old. This story, however, was vehemently disputed in his own day, and has since been pretty clearly disproved by the investigations of Scipio Maffei and Tiraboschi. The latter says he was the son of an illuminator of Venice, a native of Padua, named Benedetto Bordone, who assumed the name of Della Scala probably from some circumstance connected with his business; and that the son studied at Padua in his youth. In 1525 Scaliger went to Agen as physician to the bishop of that city, married a young girl of a noble family, and there passed the rest of his life. His writings soon placed him at the head of the classical scholars of his age, and his fame drew to Agen crowds of literary men from France and foreign countries. But, though generous with his means, he was excessively vain, and treated with unstinted abuse and contempt all who opposed him or from whom he dissented, one of his first publications being a virulent attack upon Erasmus. He wrote Latin poetry and many commentaries on the classics, and translated Aristotle's "History of Animals" and other Greek works into Latin; but his two chief productions are: *De Causis Linguae Latinae* (4to., Lyons, 1540), the first considerable modern treatise on Latin grammar, and which is still esteemed; and *Poetices Libri VII.* (fol., Lyons, 1561), a work of great erudition, but exhibiting a low standard of taste.—JOSEPH JUSTUS, the 10th son of the preceding, and his superior in scholarship, born in Agen, Aug. 4, 1540, died in Leyden, Jan. 21, 1609. He studied Latin at Bordeaux and under his father, and on the death of the latter went to Paris, studied Greek for a time under Turnebus, and then for two years confined himself to his chamber, reading all the Greek authors, and learning without aid the principal oriental and European languages. He embraced the reformed religion in 1562, and in 1563 became tutor in the family of Louis de la Roche-posay, afterward ambassador to Rome, by whom he was enabled to visit various countries of Europe. In 1578 he was teaching philosophy at Geneva, but soon afterward retired to the residence of

his patron near Tours, where most of his works were composed. In 1593 he succeeded Justus Lipsius in the professorship of belles-lettres at the university of Leyden. He enjoyed the highest contemporary fame; but he was as vain and arrogant as his father, and his latter years were embittered by a controversy with Scioppius and others on the noble pretensions of his family, which he had revived. He was never married. His most valuable works were those on chronology, *Opus de Emendatione Temporum* (fol., Paris, 1583), and *Thesaurus Temporum, complectens Eusebii Pamphili Chronicon cum Isagogis Chronologia Canonibus* (Geneva, 1609), which illustrated the epoch invented by him known as the Julian period. He also published numerous commentaries, Greek and Latin poems both original and translated, a volume of Arabian proverbs translated into Latin, &c. Two collections of his fragments, letters, poems, and conversations were published after his death, under the titles of *Scaligerana Prima* and *Scaligerana Secunda*. A valuable sketch of his life and literary activity has been published by Bernays (Berlin, 1855).

SCALLOP, a bivalve shell of the genus *pecten* (Turton), rounded, inequivalve, eared, with the upper margin straight and the hinge without teeth. The lobes of the mantle are widely separated, and include a glandular sac containing a gaseous fluid which enables their light shells to float easily and to change position with the tide; the mantle is reflected in a submarginal fold provided with tentacles, with numerous ocelli or eye spots near the margin. The mouth is jawless and toothless, with a tentacular labial border, the tentacles being short and separate from the branchiæ; they have only one adductor muscle; the foot is long and cylindrical; the branchiæ are disunited on the median line. They rest on the right side; some of the family attach themselves by a byssus, especially when young, but most are free, living at the bottom of the sea at moderate depths, moving by means of the hatchet-shaped foot and the recoil produced by suddenly opening and shutting the valves. In the common scallop (*P. concentricus*, Say) the shell is orbicular, the valves convex and nearly closed, with about 20 rounded ribs; it is dusky horn-colored, with alternating lighter and darker zones; the interior is shining white tinged with purplish, and grooved to correspond to the external ribs; the length and height are about 2½ inches, and the breadth 1 inch. It is abundant about the extremity of Cape Cod, whence it extends along its outer shore to the southward, being very common on the New Jersey coast; it varies considerably in color, with different degrees of whitish, reddish, and purplish; it is often handsomely zoned, and was formerly much employed for making card racks, pin cushions, &c. The *P. Islandicus* (Chemn.) is another American species, larger, handsomer, of a redder color, with more numerous ribs, and living more to

the north; it is found on the banks of Newfoundland, where it is a favorite food of many fishes, especially the cod. Another northern species is the *P. Magellanicus* (Lam.), with small and equal ears, and close radiating lines; it is dingy brown above and white below; it attains a diameter of 5 inches with a thickness of  $1\frac{1}{4}$ ; it is rare in Massachusetts, but common on the coast of Maine and further north; it is not ribbed on the inside. Some of the foreign species are very handsome, as the *P. pallium* (Lam.), or the duke's mantle, finely mottled with deep red; this is from the Indian seas. The *P. Japonicus* (Gmel.), a more northern species, is also a beautiful reddish shell, though it varies much. A large species, *P. maximus* (Lam.), is common on the English coast in from 30 to 40 fathoms; the deeper shell was formerly used for scalloping oysters, giving the name to this favorite dish, and also as a drinking cup, as which it is celebrated in Ossian's "hall of shells." The *P. opercularis* (Lam.) is more common in extensive banks on the N. and W. of Ireland, in 15 to 20 fathoms; the last two are esteemed as a delicate food in some places. The scallop of St. James (*P. Jacobæus*, Lam.) is common in the Mediterranean, and was worn by pilgrims to the Holy Land; it became the badge of several orders of knighthood, and figured in many coats of arms.

SCALY ANT-EATER. See PANGOLIN.

SCAMANDER (now probably the *Mendereus*), a small river of Troas, celebrated by Homer, who says that the gods called it Xanthus and men Scamander. It probably owed the former name to the yellow or brownish color of its water, which was believed to have the power of tinging the wool of sheep which drank of it. It was joined by the Simois about 20 stadia from the Hellespont, into which it fell to the E. of Cape Sigeum. Homer says it rose near Troy in two springs, one hot and the other cold. This is denied by Strabo, and the identity of the river itself is now uncertain.

SCAMMONY, a gum resin consisting of the concentered juice from the roots of the *convolvulus scammonia*, a plant which grows wild in the hedges and among the bushes in Greece and the Levant. The roots are perennial, tuberous, tapering, and 3 or 4 feet in length. The resin is collected for medicinal purposes, and is largely exported from Smyrna, and to some extent from other ports in the upper Mediterranean. The ancient Greeks were acquainted with its properties, and the method of procuring it is described by Dioscorides. As now practised, the upper parts of the roots, being laid bare of earth, are cut off two inches below the wood, and a shell or other suitable receptacle is placed so as to receive the milky juice that continues for about 12 hours to exude from the root. Each root produces only a few drams; and the mixed collections are placed in any sort of a receptacle, even in old boot legs, and left to harden. Before this takes place, however, it is the common prac-

tice to add various adulterants, such as the expressed juice of the stalks and leaves, and flour, chalk, gypsum, ashes, sand, &c. Other resins, as guaiacum, jalap resin, &c., are also used as adulterants, and to such extent that the article sold as scammony contains sometimes little or even none at all of the genuine drug. This in a state of purity may be considered as unknown in trade. The better sorts called genuine scammony are received in drums or boxes, in which the scammony is either in irregular lumps, or in flattish cakes, or in a solid mass of the shape of the containing vessel, as if it had been introduced while in a soft state. The purest variety known to English druggists, called virgin scammony, is in irregular lumps covered with a grayish powder that effervesces with acid, showing that the pieces have been rolled in chalk. It is friable, the fractured surfaces being resinous, shining, and greenish black, and under the microscope exhibiting minute air cells and numerous gray, semi-transparent splinters. It is easily reduced to a pale ash-gray powder, and rubbed with water it forms a milky emulsion. It burns readily with a yellowish flame, and should not leave more than 3 per cent. of ash. Its odor is like that of old cheese; its taste slight at first, and then acrid. Sulphuric ether should separate not less than 78 per cent. of extract, consisting principally of resin. Effervescence with acids indicates the presence of carbonate of lime, and a blue color caused by iodine that of starch introduced in the flour used as an adulterant. The resin, which is the active ingredient in scammony, should amount to 80 to 90 per cent., all of which is taken up by boiling diluted alcohol. Scammony possesses powerful cathartic properties, and is so harsh and violent in its operation that it is commonly administered in combination with other purgatives, the action of which it promotes, while its own harshness is mitigated.

SCANDERBEG, an Albanian prince and hero, whose true name was George Castriota, born at Croia in 1404, died in Lissa or Alessio, near the modern Scutari, Jan. 17, 1466 or 1467. He was the 4th son of John Castriota, a Christian prince of a small district of Epirus, of which the capital was Croia. The latter, having been made tributary by Amurath II. in 1423 (or by his predecessor in 1412, as Gibbon thinks), was obliged to deliver up his 4 sons as hostages. The 3 elder died young in a suspicious manner, and George was educated as a Mussulman, became a favorite with Amurath, received for his prowess the name of Iskenderbeg (Lord Alexander), and was made *sanjak-beg* or commandant of a district, with a force of 5,000 horse. On the death of his father in 1432 his principality was converted into a province, and from that time Scanderbeg resolved upon its recovery. He served for several years in the Turkish armies, and commanded that sent against Servia in 1489. In 1448 he was joined with the pasha of Roumelia in the



command of the army sent into Hungary, and by his management of the vanguard at a battle on the Morava purposely gave the victory to John Hunyady, with whom he is said to have previously held communication. In the confusion of defeat he extorted a firman from the government of Albania from the *reis effendi* or chief secretary of the sultan, whom with his attendants he immediately afterward slew. Hastening to Croia with a few hundred followers, its gates were opened to him, when he assumed his hereditary sovereignty, abjured Islamism, and proclaimed himself the avenger of his country's wrongs. The Albanians rose at his call, and in 30 days he had become master of all the fortresses in the country, giving the Turkish garrisons their choice between massacre and baptism. In an assembly of Albanian princes at Lissa he was appointed generalissimo, and soon collected an army of 15,000 natives, French, and Germans, with whom he defeated one of 40,000 under Ali Pasha. He was sometimes obliged to retreat to mountain fastnesses, but watching opportunities he overthrew three other large armies, and in 1449, and again in 1450, worsted Amurath himself, compelling him in the latter year, at the head of 100,000 men, to raise the siege of Croia and retreat. Mohammed II., Amurath's successor, continued the war with energy but without success, though Scanderbeg was sometimes defeated, and was harassed by internal dissensions and treason. At last peace was concluded in 1461 at the suit of the sultan, leaving Scanderbeg in full possession of his territories. At the solicitation of Pope Pius II., he then repaired to Italy to support Ferdinand of Naples against John of Anjou, and secured the victory of Troja, Aug. 18, 1462, which drove John out of Italy. The pope, at the instance of the Venetians, having proclaimed a crusade against the Turks in 1463, Scanderbeg broke the truce, renewed the war unsupported, defeated two of the best Turkish generals in several battles, forced Mohammed himself, with an army of 100,000, to retreat in 1465, drove another army of 80,000 from before Croia, and during 3 days massacred its remains in the defiles of Tyranna. Gibbon believes, from a sifting of evidence, that he finally met with signal reverses, applied to the pope for a refuge, and died a fugitive; but according to the common statement, he continued triumphant, and was attending a council of Albanian princes at the time of his death. He was buried at Lissa, and when the Turks took the town soon after, the Janizaries disinterred his bones and used them as amulets. He left a young son to the guardianship of the Venetians, whose descendants held a Neapolitan dukedom. His life has been written, among others, in Latin, by his contemporary and friend Marinus Barletius (first printed at Frankfort, fol., 1537; afterward translated into French and German); in French by C. Paganel (1856); and in English by Dr. C. C. Moore of New York (New York, 1850).

SCANDINAVIA, the ancient name of that portion of Europe now comprised in the kingdoms of Denmark, Norway, and Sweden, and the island of Iceland.

SCAPULARY, or SCAPULAR (Lat. *scapula*, the shoulder blade), a part of the habit of certain religious orders, worn over the robe of both sexes. It consists of 2 strips of cloth which cover the breast and back and hang down to the knees or to the feet. The scapulary of Our Lady of Mount Carmel is composed of 2 pieces of brown cloth, 2 or 3 inches square, which are connected by ribbons or strings about 2 feet long, and worn over the shoulders in such a manner that one of the pieces may hang upon the breast and the other upon the back. The confraternity of the scapulary of Mount Carmel, composed of all who wear this little habit, is not restricted to members of religious orders, but is very widely diffused among secular persons. It is believed by Catholics to have been instituted by the Virgin Mary, who appeared in a vision to the blessed Simon Stock, general of the Carmelite order (died 1265), and giving him a scapulary promised her special protection to all who should wear it in her honor.—There are various other scapularies in use in the Roman Catholic church intended to encourage particular devotions, such as those of the passion of Christ and of the seven sorrows of the Blessed Virgin. They differ from one another only in color and in the symbolical figures, which are generally stamped or worked on them. Certain prayers are to be said daily by all who wear them.

SCARABÆUS (Linn.), the representative genus of a large family of pentamerous lamellicorn beetles, having the antennæ generally terminated by a club, and either composed of leaflets or of box-like joints. Of the old family several thousand species were enumerated, of about 200 genera, but these are now separated into many distinct families. The proper *scarabæida* or *coprophagi* comprise those which live in and feed upon excrements, especially those of herbivorous animals. The form is generally short and thick, and their color shining black or brilliant metallic; they excrete an oily matter, which prevents the substances among which they live from adhering to them; they are able to dig very rapidly into the ground; in the spring they are in the habit of enclosing their eggs in small pill-like balls of dung, which they roll along by the hind feet to holes in which they are to be deposited.—The type of this family is the genus *ateuchus* (Weber and Fabr.), equivalent to the genus *scarabæus* of McLeay; this is peculiar to the old world, and of more than 40 species nearly 30 belong in Africa. The body is rounded, flattened above, the 4 posterior limbs hairy and ending in a single spur; the external edge of the wing covers is nearly straight, and the head is lobed and festooned in front. There were 2 species worshipped by the ancient Egyptians, and often represented by their hieroglyphics and on

their monuments; models of them were made in the most precious materials, and were worn as charms around the neck of the living, and buried with their mummies; the insects themselves have also been found in their coffins. The *A. (S.) sacer* (Oliv.) is black and about an inch long, and is found in S. Europe, W. Asia, and N. Africa. The *A. (S.) Egyptiorum* (Latr.) is larger and wider, of a green color with golden tints, and is found principally in Egypt; they are strong on the wing, not very firm on the anterior feet while rolling their balls, and when on the back have considerable difficulty in rising. Scarabæi are represented on the monuments in various positions, and often of gigantic dimensions; they were known to Aristotle. They were considered symbolic of the world on account of the globular form of the egg balls; of the sun, from the ray-like projections of the head; and of a warrior, from the belief that all were males, whence they were also worn as symbols by the Romans. As typical of the sun, the source of fertility, they were worn by women to render them prolific. There are many marvellous stories and superstitions connected with these insects.

**SCARAMOUC** (Ital. *scaramuccia*, skirmish), a grotesque personage in the old Italian comedy, habited in the Hispano-Neapolitan costume, and representing the braggadocio and bully who is finally beaten by Harlequin. The character is of Spanish origin. One of its most famous representatives was Fiorelli, who gained the royal favor in France by making the young dauphin (afterward Louis XIV.) laugh. He was so agile that when over 80 years old he could give a box on the ear with his foot.

**SCARBOROUGH**, a seaport town and watering place of England, in the north riding of Yorkshire, 39 m. N. E. from York; pop. in 1861, 12,915. It is picturesquely situated on a rocky declivity and along the N. shore of an open bay of the North sea. The mineral waters are esteemed very serviceable in curing complaints of the stomach, and the town is much frequented in summer for sea bathing. The peninsula to the N. E. is crowned with an ancient castle.

**SCARLATINA.** See SCARLET FEVER.

**SCARLATTI**, ALESSANDRO, an Italian composer, born in Naples in 1650, died in Rome in 1725. He was instructed in music by Carissimi, and the introduction of violin accompaniments to airs, the ritornel, and the *da capo* are ascribed to him. He is said to have produced 200 masses, 100 operas, and 3,000 cantatas, for the last of which he frequently furnished the words. But a small portion of these works are now known.—DOMENICO, son of the preceding, and a composer, born in Naples in 1683, died in Madrid in 1751. He was chapelmaster to the queen of Spain, and produced numerous operas, but is best known by his *Suites de pièces pour le clavecin*, 42 in number, the successful performance of which was long regarded as the greatest test of ex-

cellence in a pianist, although they are now nearly obsolete.

**SCARLET FEVER**, or **SCARLATINA**, a contagious, febrile exanthem, characterized by an inflammation of the throat and by a peculiar eruption. For a long time scarlet fever was confounded with measles, and the characteristic differences between the two diseases were first thoroughly described at no very remote date. The period of incubation is somewhat uncertain, varying from 3 to 10 days. The appearance of the eruption when the attack is severe is commonly preceded by pain in the head and limbs, loss of appetite, prostration, and febrile excitement more or less intense. The tongue is red at the tip and on the edges, there is slight sore throat, and on examination the pharynx and palate are found to present a more or less punctillate redness. When present, the fever of invasion precedes the eruption from 12 hours to 4 days, the most usual period being about 2 days. The eruption in general first shows itself about the neck, afterward appearing on the face, and then spreading to the trunk and limbs. It consists of numerous red points upon a rose-colored ground. Sometimes it appears in large patches, and sometimes the whole skin is of a bright scarlet, burning, dry, and rough. With the appearance of the eruption a disagreeable itching attacks the patient, rendering him restless and increasing the fever. The tongue, at first covered with a white coat, through which the red papillæ are seen protruding, afterward becomes clean and of a deep red color, the enlarged papillæ giving it a strawberry-like appearance. The febrile excitement frequently runs high, and there is loss of appetite, thirst, restlessness, loss of sleep, often delirium, while the patient is annoyed by the troublesome itching attendant upon the eruption. With these symptoms the tonsils, pharynx, and palate are swollen, inflamed, and often ulcerated. The eruption is at its height on the 3d or 4th day; it is then most marked on the lower part of the abdomen, on the inner part of the thighs, and about the folds of the articulations. From time to time it varies in intensity, excitement or an exacerbation of the fever rendering it brighter and more copious. After a period varying in different cases from 3 to 8 days, the eruption grows paler and gradually disappears; at the same time the cuticle is found to desquamate, separating from the face and body in minute bran-like scales, but from the hands and feet in large flakes, or sometimes forming casts of those organs.—Three varieties of scarlet fever are ordinarily described: 1, *scarlatina simplex*, in which there is a bright rash, but with very little sore throat or fever, the patient being scarcely at all ill; 2, *scarlatina anginosa*, in which there are both fever and affection of the throat, varying from cases comparatively slight to those which endanger life, or prove fatal; and 3, *scarlatina maligna*, in which the eruption is imperfect, and often of a bluish or livid tint, or it may not

appear at all; the fever is of a typhoid type, and the throat ulcerated and gangrenous. Sometimes these cases prove fatal in a few hours, the patient seeming to sink directly under the influence of the poison, without any very decided local manifestations. In other cases the debility is extreme, the pulse frequent and very feeble, the throat becomes immensely swollen, obstructed with viscid mucus, gangrenous, and communicating an intolerable fetor to the breath. Such cases almost invariably prove fatal.—Scarlet fever is frequently followed by the development of some one of the numerous forms of struma, glandular swellings, chronic inflammation of the lining membrane of the ear with offensive discharge, chronic inflammation of the eyes and eyelids, &c. Sometimes a form of subacute rheumatism, affecting the larger joints, supervenes. The most frequent and the most dreaded of the *sequela* of scarlet fever is dropsy. Commonly it assumes the form of anasarca, or swelling of the whole surface; often however effusion into the serous cavities likewise occurs. In all such cases the urine is found diminished in quantity, high-colored, and coagulating on the application of heat or the addition of nitric acid. It is attended with a dry skin, a frequent pulse and hurried breathing, and prostration; sometimes nervous symptoms, headache, drowsiness, or convulsions are present. Dropsy follows the mild as well as the severer forms of scarlet fever. It is commonly attributed to cold during the period of desquamation, but more or less desquamative disease of the kidneys attends every case of scarlet fever, and it is probable that this when severe may be followed by dropsy, quite independent of any undue exposure to cold.—The milder and happily the more frequent forms of scarlet fever require little or no treatment. Where there is much fever and heat of skin, frequent sponging with tepid or with cold water is of service; the bowels should be moved if necessary by some mild laxative, and a bland and unirritating diet prescribed. The itching of the skin is best relieved by anointing the body thoroughly with oil or lard. In severer cases it is necessary to support the strength of the patient, and quinine, iron, and stimulants may be resorted to, while a detergent or astringent gargle may be used for the throat. In cases of malignant scarlet fever, if there be any hope for the patient, it will be found in a liberal use of stimulants. The dropsy that follows scarlet fever is best treated by the free use of hydragogue cathartics and the hot bath, followed, when the swelling is reduced and the urine has become paler and more copious, by the administration of iron. The other *sequela* should be treated according to their character and to the constitution of the patient. The homœopaths depend mainly upon aconite and belladonna in the milder attacks, and upon arsenicum and phosphoric and nitric acids in the severer cases. They use hellebore, digitalis, apis, and apoc-

num in the dropsical affections which often follow the disease.

SCARLETT, SIR JAMES YORKE, a British soldier, born in 1799. He is the second son of Lord Abinger, was educated at Eton and Trinity college, Cambridge, and in 1818 entered the army as an officer of the 18th hussars, soon after the disbanding of which he received a commission in the 6th dragoons. He became lieutenant-colonel of the 5th dragoons in 1840, and colonel in 1852. When the expedition to the Crimea was undertaken, he was appointed a brigadier-general and took command of the heavy cavalry. On Oct. 25, 1854, his brigade made the famous charge at Balaklava, routing more than double their number of Russian cavalry with great slaughter; and on the same day it brought out of action the light brigade which had charged under Lord Cardigan with equal gallantry but less success. For his services on this day he was made a major-general on Dec. 12 following, and when Lord Lucan returned home he took command of the entire British cavalry force in the Crimea. He was created a K.C.B. in July, 1855.

SCARPA, ANTONIO, an Italian anatomist and surgeon, born at La Motta, a village of Friuli, June 13, 1747, died in Pavia, Oct. 31, 1832. He was educated at Padua, and at the age of 24 became professor of anatomy in the university of Modena. In 1783 he was appointed to the same chair in the university of Pavia, and in 1814 became director of the faculty of medicine in that institution. He was an exact and patient observer, and surgical anatomy owes its first development to his labors. His principal works have been translated into English and other languages.

SCARRON, PAUL, a French comic dramatist and novelist, born in Paris in 1610, died Oct. 16, 1660. He led a gay and dissolute life in his youth, but the death of his father left him penniless, and a disease made him a cripple and distorted his whole frame. He then applied himself to literature for a support, and soon acquired such a reputation by his caricatures and humorous sketches as to be styled the "emperor of the burlesque." What he earned by his pen, together with the proceeds of a benefice granted him by his friend Lavaradin, bishop of Le Mans, and a pension from the private purse of the queen, enabled him to live at ease, and his house was the favorite resort of wits and noblemen who relished a good joke or a merry supper. During the war of the Fronde he was one of the opponents of Mazarin, and wrote the *Mazarinade*, which cost him his pension. In 1652 he married Françoise d'Aubigné, afterward celebrated as Mme. de Maintenon. His comedies, among which were *Jodelet* (1645), *Don Japhet d'Arménie* (1658), and *L'écolier de Salamanque* (1654), were well received; but he was indebted for his greatest success to his burlesque of Virgil, *L'Enéide travestie*. His best work however is *Le roman comique*. The best edition of

his complete works is that of Bruzen de la Martinière (10 vols. 12mo., Paris, 1737).

SCAURUS, MARCUS ÆMILIUS. I. A Roman senator and consul, born in 163 B. C., died between 90 and 88. Though belonging to the patrician Æmilia gens, he was extremely poor in his youth; but having studied eloquence and gained distinction in the army, he was elected curule ædile in 128, prætor urbanus in 120, consul in 115, censor in 109, and consul again in 107. During his first consulship he obtained a triumph for victories over the Ligurians and other Alpine tribes, and was made *princeps senatus*. When Adherbal in 117 sought assistance from the Romans against Jugurtha, Scaurus was one of the few nobles who refused the bribes of the latter, and urged his punishment. This, however, was rather the result of policy than principle, as he afterward accumulated great wealth by peculation and bribery. He was several times accused of these and other crimes, but always escaped punishment through the influence gained over the people by his eloquence and diligent discharge of public duty, notwithstanding that he distinguished himself by opposition to the Gracchi and all other popular leaders. An embassy to Africa in 112, with Scaurus at its head, to secure justice to Adherbal from Jugurtha, having failed, war was declared by Rome, and Scaurus accompanied the army as legate of the consul Bestia. Jugurtha secured peace by bribing the leaders, whereupon a great outcry was raised at Rome; but Scaurus, though one of the most guilty, escaped by contriving to be appointed one of the *quasitores* ordered to investigate the offence. II. Son of the preceding, chiefly celebrated for his mercenary crimes. He was stepson to Sylla, whose proscriptions enabled him to add immensely to his wealth. In the third Mithridatic war he served as quæstor under Pompey, and in Judæa received a large bribe from Aristobulus for deciding in his favor the contest for the crown between him and his brother Hyrcanus. Pompey reversed his decision, but left him unpunished in command of Syria; and having made a predatory incursion into Arabia Petræa, he was bought off by Aretas, the king, for 300 talents. In 58 B. C. he was elected curule ædile, and expended all his wealth to celebrate the games with unparalleled splendor, building a temporary theatre large enough to hold 80,000 persons, decorated with 360 costly columns and 3,000 statues. He was prætor in 56, and in 55 governed Sardinia, whose inhabitants he plundered to obtain the means for paying his debts and securing the consulship the next year. For this he was brought to trial before a tribunal presided over by Cato; but though his guilt was undoubted, his defence by Cicero, Hortensius, and 4 other advocates, and his own tears and appeals to the splendor of his ædileship, procured his acquittal. Some time later he was condemned for illegal efforts to obtain office, after which his name disappears from history. His residence

on the Palatine hill was celebrated for its magnificence.—His son Marcus Æmilius accompanied Sextus Pompey, his half brother, to Asia, and after the loss of his fleet betrayed him to the generals of Antony; and his grandson Mamercus, called by Seneca the last of the Scauri, a dissolute orator and poet, was in the reign of Tiberius accused of treason and of adultery with Livia, and finally committed suicide.

SCÉPTRE (Gr. *σκήπτρον*, or *σκηπτορ*, a staff), an ensign of royal authority. Although in that light of greater antiquity than the crown, it was originally no more than a simple walking stick. In very ancient times it was borne not only by the princes, but by heralds, judges, and priests; but its use was more common among the Asiatics than among the Greeks and Romans, inasmuch that among the former all classes of those holding authority, including eunuchs, were called *σκηπτουχοι* (sceptre bearers). In antiquity it was customary to swear by the sceptre, taking it by the right hand and lifting it toward heaven. It became by degrees the emblem of royal power only, and from the Roman emperors was transmitted to the western monarchs.

SCHADOW, JOHANN GOTTFRIED, a German sculptor, born in Berlin in 1764, died there, Jan. 26, 1850. He studied the antique in Rome, and repairing to Vienna in 1788 attracted notice by a monument to Count von der Mark, natural son of Frederic William II. He was thenceforth extensively employed on monumental works of a public character, of which his colossal statue of General Ziethen at Berlin, his equestrian statues of Frederic the Great at Stettin and of Blücher at Rostock, and his statue of Luther at Wittenberg, are specimens. For the last 28 years of his life he held the office of director of the academy of fine arts in Berlin. He is the author of several works on art.—FRIEDRICH WILHELM VON SCHADOW-GODENHAUS, a painter, son of the preceding, born in Berlin, Sept. 6, 1789. He went to Rome when young, where he cooperated with Cornelius and Overbeck in the establishment of a new German school of painting, and became a convert to the Roman Catholic church. After discharging for some time the duties of professor in the academy of fine arts at Berlin, he succeeded Cornelius in 1826 as director of the Düsseldorf academy. He was ennobled by the king of Prussia in 1843. His works are to be found chiefly in Düsseldorf, Berlin, and other German cities. Characteristic specimens of his style are: "Mignon" (1828), frequently engraved; the "Four Evangelists," in the Werder church, Berlin; the "Wise and Foolish Virgins," in the museum in Frankfort-on-the-Main; the "Fountain of Life," in the possession of the king of Prussia; and an allegorical series entitled "Paradise," "Purgatory," and "Hell." After the completion of the latter work he became totally blind; but he subsequently recovered his sight sufficiently to resume the practice of his art. He is the author

of a treatise in French on the influence of Christianity upon painting.

SOHAFARIK, PAVEL JOZEF, a Slavic writer, born in Kobeljarowo, in northern Hungary, May 13, 1795, died in 1861. He was educated at the university of Jena. From 1819 to 1833 he was professor in the Servian gymnasium at Neusatz, and then went to Prague, where he devoted himself to the study of Slavic literature, and in 1848 became librarian of the university of that city. In 1849 and 1851 he was placed at the head of the commissions in Prague and Vienna charged with the duty of establishing a fixed terminology for the Slavic language. His works, chiefly of a historical and philological character, are numerous and important.

SCHAFF, PHILIP, Ph.D., D.D., an American divine, born in Chur, canton of Grisons, Switzerland, Jan. 1, 1819. He was educated at the universities of Tübingen, Halle, and Berlin, at the last of which he was graduated doctor of philosophy and licentiate of divinity in 1841. He then travelled as private tutor of a Prussian nobleman through France, Switzerland, and Italy (1841-'2), and returning to Berlin commenced as lecturer on theology. In Oct. 1843, the synod of the German Reformed church assembled at Winchester, Va., invited him to become professor of theology at Mercersburg, Penn.; and having been ordained at Elberfeld, he emigrated to America in 1844. On the ground of some supposed unsound views expressed in a work published at Berlin before his call to America, and also in his inaugural at Mercersburg, the charge of heresy was brought against him, but he was honorably acquitted by the synod assembled at York, Penn., in 1845. Since that time he has labored at Mercersburg, teaching, preaching, and writing, in connection first with Dr. Nevin and then with Dr. Wolff, with the interruption of only one year (1854), which he spent in a European visit, lecturing on America in Berlin and other places, and representing the German churches of America at the German church diet at Frankfort-on-the-Main, and before the Swiss pastoral conference in Basel. He received from the university of Berlin in 1854 the degree of D.D. He has published in German "The Sin against the Holy Ghost" (Halle, 1841); "On James and the Brothers of Jesus" (Berlin, 1842); "The Principle of Protestantism" (German and English, Chambersburg, Penn., 1845); "History of the Apostolic Church" (Mercersburg, 1851; 2d ed., Leipsic, 1854; translated into English by the Rev. E. D. Yeomans, New York and Edinburgh, 1853; translated also into Dutch and French); "German Hymn Book, with a Historical Introduction, Critical and Biographical Notes" (Philadelphia and Berlin, 1859); and in English, "What is Church History? A Vindication of the Idea of Historical Development" (Philadelphia, 1846); "St. Augustine, his Life and Labors" (New York, 1853; German, Berlin, 1854); "America, its Political, Social, and Religious Character," lectures delivered by re-

quest at Berlin in 1854, and translated into English (1855); "Germany, its Universities and Divines" (Philadelphia, 1857); "History of the Christian Church of the first three Centuries" (New York and Edinburgh, 1858), which is to be continued down to the present time in 4 or 5 volumes; "The Moral Character of Christ, or the Perfection of Christ's Humanity a Proof of his Divinity" (1860); and "A Catechism for Sunday Schools" (1861), beside many contributions to American and foreign periodicals. Dr. Schaff also published the *Kirchenfreund*, a theological monthly for the German churches of America, from 1848 to 1853, and has been co-editor of the "Mercersburg Review" since 1857.

SCHAFFHAUSEN, a canton of Switzerland, bounded S. by the cantons of Zürich and Thurgau, and on all other sides by Baden; area, 115 sq. m.; pop. in 1850, 85,300. The surface is rugged, being traversed by low ramifications of the Jura range. The Rhine forms the S. boundary line. The climate is healthy and temperate. Agriculture forms the principal occupation of the inhabitants.—SCHAFFHAUSEN, the capital, is situated on the slope of a hill, on the right bank of the Rhine, 24 m. N. from Zürich; pop. 8,000. It is surrounded by walls and overlooked by an old castle. About 3 m. below the town are the Schaffhausen falls, where the Rhine, here about 300 feet broad, descends a height of more than 70 feet.

SCHALLER, JULIUS, a German philosophical writer, born in Magdeburg in 1810. He first studied theology at Halle, but afterward turned his attention to philosophy, of which he became teacher there in 1834 and adjunct professor in 1838. His first works, *Die Philosophie unserer Zeit* (Leipsic, 1837) and *Der historische Christus und die Philosophie* (1838), addressed to Strauss, were written in defence of Hegelianism. His *Geschichte der Naturphilosophie von Bacon bis auf unsere Zeit* (2 vols., Leipsic, 1841-'4) was announced as an introduction to a work on the science of natural philosophy. In this department his efforts have been specially directed against materialism, and the theories of Vogt and Moleschott. He has also written *Vorlesungen über Schleiermacher* (Halle, 1844), and *Darstellung und Kritik von Ludwig Feuerbach* (Leipsic, 1845); and with Giebel he has edited since 1850 the *Weltall*, a popular scientific review.

SCHAMYL. See SHAMYL.

SCHARNHORST, GEBHARD DAVID VON, a German soldier, born at Hamelsee, Hanover, Nov. 10, 1756, died in Prague, June 28, 1813. He entered the artillery service, and soon became known by the invention of a micrometric spy glass and by statistical tables. In 1780 he was made professor in the military school at Hanover, and in 1793 captain of light artillery, having meantime published several valuable military works. In 1794 he was presented with a sword by the king of England for his services in the defence of Menin under Gen. Hammerstein. He soon after entered the

Prussian service as lieutenant-colonel, was for some time instructor of officers at Berlin, and in 1804 received the rank of colonel and a patent of nobility. At the battle of Auerstädt in 1806 he was chief of Blücher's staff, and was twice wounded; and he took part in that of Eylau in the following year. After the peace of Tilsit he was made major-general and president of the commission for the reorganization of the army, of which he was at length charged with the whole administration, and gave it an entirely new constitution and a higher tone. He also disciplined great numbers of volunteers throughout the country, and laid the foundation of the *Landwehr* system. He was thus enabled at the opening of the campaign of 1813 to arm all the able-bodied men of Prussia, and to give efficiency to the enthusiastic national spirit then aroused. With the rank of lieutenant-general he served as chief of the staff of the army under Blücher, was wounded at the battle of Lützen, and, departing immediately afterward for Vienna to engage the emperor Francis in the cause of the allies, died on the way. There is a marble statue of him by Rauch before the main guard house at Berlin.

SCHAUMBURG-LIPPE, a German principality, embraced between Hanover, Hesse-Cassel, and Westphalia; area, 171 sq. m.; pop. in 1858, 80,144. The surface toward the N. is level, but becomes hilly in the S., and the soil is very fertile. There are only a few small streams, tributaries of the Weser. A large forest, the Schaumburger Wald, is in the W., and the Steinhuder Meer, a small lake, in the N. Coal and limestone are found, the Bückeburg containing rich seams of the former. It is the 32d state in the Germanic confederation, and has one vote in the *plenium*. Its military contingent is 555 men. The government is a constitutional monarchy. The reigning prince is George William (born Dec. 20, 1784), who assumed the reins of government in 1807. Capital, Bückeburg.

SCHEELE, KARL WILHELM, a Swedish chemist, born in Stralsund, Pomerania, Dec. 19, 1742, died at Köping, near Stockholm, May 21, 1786. After serving an apprenticeship to an apothecary at Gothenburg, he went in 1765 to Malmö and in 1773 to Upsal, where he gained the friendship of Bergman. In 1777 he was appointed by the medical academy apothecary at Köping, where he married the widow of the previous incumbent. His experiments were performed with very imperfect apparatus, and under great disadvantages; yet, with the exception of Priestley, he probably discovered more new substances than any other chemist, including tartaric acid, manganese, chlorine, barytes, the pigment called Scheele's green, the coloring principle of Prussian blue, &c. (See *CHEMISTRY*, vol. v. p. 36.) His researches were chiefly published in the "Transactions" of the academy of Stockholm. In his "Chemical Observations and Experiments on Air and Fire" (Stockholm, 1777; translated into English by

Kirwan), with no knowledge of the previous discovery of Priestley, he described oxygen under the name of empyreal air.

SCHÉFFER, LEOPOLD, a German poet and novelist, born in Muskau, Lower Lusatia, July 30, 1784. After being 6 years general superintendent of the estate of Prince Pückler-Muskau, he travelled in England and Germany, studied for a few years in Vienna, and then visited Italy, Greece, Turkey, and Asia Minor. He returned to Germany in 1820, and settled in his native village. In 1811 his first work appeared under the title of *Gedichte mit Compositionen*. His novels, most of which were first published in periodicals, have been often reprinted collectively. He has also written *Die Göttliche Komödie in Rom* (Leipsic, 1846); *Graf Promnitz* (1846); *Genetion von Toulouse* (1846); and *Die Sibylle von Mantua* (Hamburg, 1853); beside several volumes of poems, of which the *Laienbretier* (Berlin, 1834) has passed through numerous editions, and several symphonies, overtures, and *capriccios* for the piano.

SCHIEFFER, ARY, a French painter, born in Dordrecht, Holland, in 1794, died in Paris, June 15, 1858. At 12 years of age he painted a historical picture which attracted much attention in the exhibition at Amsterdam. Subsequently he studied his art in Paris under Baron Guérin. Many of his works were suggested by the poems of Goethe, Uhland, and other German authors, but the most characteristic in style are those devoted to religious subjects. Of the latter class his *Christus Consolator*, "Dead Christ," "Three Marys," "Christ weeping over Jerusalem," *Mater Dolorosa*, the "Temptation," and others are choice specimens. His several pictures of "Mignon," his "Francesca da Rimini," "Dante and Beatrice," and his illustrations from "Faust," are widely known by engravings. He painted a few portraits, including those of Lafayette, Talleyrand, Béranger, Lamartine, and Charles Dickens. His life has been written by Mrs. Grote (London, 1860).

SCHELDT (Flem. *Schelde*; Fr. *Escaut*; anc. *Scaldia*), a river of France, Belgium, and Holland, having its source in a small lake on Mount St. Martin in the French department of Aisne. It first flows N. by Cambrai to Condé, then N. W. to the frontiers of West Flanders, Belgium, then N. N. E. between that province and Hainault into East Flanders. It receives the Lys at Ghent, and runs E. during the remainder of its course through Flanders, then N., forming the boundary between Antwerp and East Flanders, and finally turns W. by N., and enters the North sea in the Dutch province of Zealand by two broad mouths called the Hond or West Scheldt (the main stream) and the East Scheldt. The arms connecting these two mouths form the islands of North and South Beveland and Walcheren, while by other arms the East Scheldt communicates with the Meuse and the Rhine. The principal tributaries of the Scheldt are the Heine, Dender, and Rupel on the right, and the Sensée, Scarpe, and Lys

on the left. The chief towns on its banks, beside those named, are Valenciennes, Tournay, Oudenarde, Rupelmonde, and Antwerp. Its length is 211 m., and it is navigable to within a few miles of its source. An immense commerce is carried on through its waters, and the canals which connect it with the principal cities and towns of Belgium. In the lower part of its course it is bordered with dikes.

SCHELLING, FRIEDRICH WILHELM JOSEPH VON, a German philosopher, born at Leonburg, near Stuttgart, Württemberg, Jan. 27, 1775, died at Ragaz, Switzerland, Aug. 20, 1854. His father, distinguished as an orientalist, was pastor at Leonburg, and subsequently prelate in Maulbronn; and under his tuition Friedrich laid the foundation of ripe attainments in the classics, and in Hebrew and Arabic. Devoted to theology, he entered the university of Tübingen at the age of 15, and studied philosophy under Adler, a disciple of Wolf, and divinity with Storr. His essay for the doctorate of philosophy was on the origin of evil, as narrated in Gen. iii. His next treatise, in the *Memoirabilia* of Paulus (1793), was on myths and sagas. Thus his earliest and latest thoughts revolved around the same themes; though in the youthful speculations, the idea of revelation is repudiated as "an idea of reason." In 1794 appeared his first metaphysical essay on the "Possibility of a Form of Philosophy," reproducing, in an independent way, the subjective idealism of Fichte, and emphasizing the *Ego* (self) as the fixed centre of speculation, in which both substance and form are identical. The *Non-Ego* (not-self) is deduced by a necessity of thought from the *Ego*; the union of the two follows by a like necessity. These three postulates give the unconditional (the *Ego*), the conditional (the *Non-Ego*), and the conditional determined by the unconditional (the representative conception), as the basis of science. Thus all being is derived from the *Ego*. In his next dissertation, 6 months later, on the "Ego as the Principle of Philosophy," Schelling advances to the position that the unconditional principle of philosophy must be the absolute subject, as the union of thought and being. Fichte said: The *Ego* is absolute; Schelling now says: The absolute is *Ego*—a phrase which implies a revolution. In his "Letters on Dogmatism and Criticism" (Niethammer's "Journal," 1795) he grapples with Kant's sundering of the respective spheres of the theoretical and practical reason (see KANT), denouncing this dualism, and contending that there must be something unconditional, which is the common source of both the objective and the subjective. There is "an intellectual intuition" of the unconditional. Allowing the equal validity of both the subjective and objective, he already demands for both a higher unity. Thus at the age of 20, before he left the university, he had found the principle of his peculiar system, which was to supersede the critical philosophy of Kant, and the subjective idealism of Fichte.

After leaving Tübingen, he taught for two years at Leipsic, and wrote "Illustrations of the Idealism of the Theory of Science" (Fichte's). A severe nervous fever brought him to the borders of the grave. At the age of 24 he went to Jena, parted company with the idealism of Fichte, and began his more independent career in a series of brilliant lectures, which aroused the highest enthusiasm. Steffens says that the keenest intellectual delight of his life was in listening to his elevated speech, always suggesting more than it expressed. In beauty and flexibility of style modern philosophy has nothing more finished than some of his earlier works, as his dialogue on Bruno, his oration on the "Arts of Design," or some of his later disquisitions, e.g., that on the "Source of Eternal Truths." At Jena he taught in converse with Fichte and Hegel; for Jena was then the philosophical centre of Germany. Hegel was older in years, but younger as a student. They edited the "Philosophical Journal" together, and were not yet sensible of their divergence. Reinhold here taught the Kantian philosophy, and opposed the innovations of the system of nature. Here too were Schiller, Wilhelm von Humboldt, and the Schlegels; and Goethe was not far distant. Here was developed the second stage of Schelling's speculations, in his "Philosophy of Nature and Transcendental Idealism" (1796-1800). In rapid succession he published "Ideas for a Philosophy of Nature" (1797); "The Soul of the World" (1798); "First Sketch of a System of the Philosophy of Nature" (1799); an "Introduction" to the latter; and his "System of Transcendental Idealism" (1799); all originally read as lectures, and some of them more carefully digested in the "Journal for Speculative Physics" (1802). His choice of nature as the subject of his speculations indicated his revolt from the subjective tendency. Fichte had neglected the outer world. Kant had indeed vindicated the dynamic against the corpuscular theory of matter, but he also held that the laws and order found in nature were not its own, but imparted to it by the investigating mind. Schelling said: Nature is life, a living organism, replete with formative powers; there is an ideal in the real, a subject in the object, reason in matter. Nature is autonomic; there is a soul of the world, its immanent principle. Grasping this soul, we re-create nature. It is all one living organism, a perpetual process of production, through the whole series of inorganic and organic forms. All is pervaded by one law, the law of evolution; and that law is a law of polarity, of polar forces. These act and react perpetually, as is seen in the phenomena of magnetism, electricity, and chemical agency. The mechanical theory of nature was superseded by the idea of living forces. Experiment has verified some of Schelling's prognostications; but the progress of research has left to his system as a whole only the value of a bold attempt at the reconstruction of nature.



He also applied the same principle of polarity in a more universal sense, in his "Transcendental Idealism," which gives the outlines of the philosophy of spirit—the counter-pole to matter. The attempt is here made to derive all parts of philosophy from the intellectual intuition, considered as an act of the subject bringing the objective before it, an act in which the highest freedom and the highest necessity concur. Here the theoretical and practical parts of philosophy are unfolded, including an outline of the course of history, as a drama, which one mind has poetized; but that one mind is not yet with Schelling a personal deity. The third division of this treatise is on the "Philosophy of Art," following out the hints contained in Kant's "Criticism of the Judgment." Art is well nigh deified; it is viewed as the highest product of man, the perfected union of the ideal and the real, of the subject and the object. The infinite embodied in the finite is in every work of art; the artist grasps the eternal idea and realizes it in a perfected form; he is a creative genius, and yet works under the law of necessity. These views are further unfolded in his elaborate essay on "The Relation of Art to Nature" (1807).—By an inward and logical necessity Schelling was led on to another, the third, stage of his system, known as the philosophy of identity. The necessity of this advance is manifest. As he himself says: "Since Kant, the subjectivity of the substance has been the centre of philosophy. Fichte grasped the Ego, not as universal, but as individual. In defining the substance as subject he found the true principle of movement in philosophy; and this principle must carry philosophy further on." Schelling had already considered nature by itself, and spirit by itself; but the two, in a complete system, cannot remain sundered. The ideal and the real, the subjective and the objective, he next says, are identical. This he attempts to show in his exposition of his system in the "Journal for Speculative Physics" (1801), in relation to nature—a fragment of his project; and in a more popular way, in his "Lectures on the Method of Academic Study" (1808). In this doctrine of absolute identity, we have the most enigmatical and obscure, not to say paradoxical stage of his philosophy, which at that time, as Hegel said, "he made before the public," not yet waiting, as Kant always did, for his ripened statements. If taken as his whole and final system, it is a pantheistic mysticism; but Schelling, in his later account of it, says that it represents only the negative, abstract side of his philosophy, to be supplemented by its positive and historical portions. To escape the dualism of the subjective and objective, the ideal and the real, he had recourse to this abstract and absolute identity of both, revealed to the pure intellectual intuition (*Anschauung*). The absolute is the indifference, the equipoise, of the ideal and the real; the idea is the substance, and the substance is the idea; the form

is the essence, and the essence is the form. The antagonisms of subjective and objective, ideal and real, essence and form, vanish in this pure vision of primal being. When the absolute becomes the relative, the infinite the finite, then the distinctions of ideal and real, subject and object, break forth, as light is broken into colors by the prism. But even in the finite, nothing is either wholly subjective or wholly objective; in its two poles there is respectively a relative preponderance of the ideal or the real, whence come spirit and matter. The absolute revealed in nature gives us the "powers" of weight, light, life, organism, &c., culminating in man; the same absolute in the ideal sphere gives truth, goodness, and beauty, or science, religion, and art, culminating in the state, and rising to philosophy as the crown of the whole. This scheme is imaged forth as an endless magnetic line, with a point of indifference ( $A=A$ ), and two poles, in which A and B respectively preponderate.

$$\begin{array}{ccc} + & & + \\ A = B & & A = B \\ & A = A & \end{array}$$

This system of absolute identity, it is at once apparent, is constructed in the geometric method, following the example of Spinoza; and the ideal and real poles are in fact parallel with the two "modes" of thought and extension in the ethics of Spinoza. In the principle of identity itself, there is no sufficient ground or cause for the alleged development. Here then arose the question: How is this development to be accounted for? how is this transition from the absolute to its modes to be explained? And it is around this point that the subsequent speculations of Schelling revolve, though for many years he struggled in the vain attempt to reconcile the pantheistic tendencies of these earlier essays with the theistic and Christian positions which he gradually adopted and defended.—In this transition period he was called from Jena to Würzburg (1804), where he taught for two years, in fellowship and sometimes in rivalry with Paulus and J. J. Wagner. In 1808 he became secretary of the academy of the arts of design in Munich; in 1820 he withdrew to Erlangen to write his "Philosophy of Mythology and of Revelation." In 1825, when the university of Munich was established, he began to unfold his new views in the city of art and philosophy which King Louis had created, and attracted enthusiastic auditors from all parts of Germany, from France, England, and Greece. The works which he meanwhile published indicate the struggles and progress of his system. In his "Bruno, or the Divine and Natural Principle of Things" (1802), he discoursed, in the manner of the Platonic dialogue, upon the unity of the infinite and finite, the possible and the real, as these must be found in the eternal being; expressly denying that the knowledge of the absolute can be attained in "a merely logical way." His work on "Philosophy and Religion" (1804), in reply to Eschenmayer,

who complained of the neglect of moral and religious principles in his system, develops the idea of divine freedom, in relation to creation. Still maintaining (what he subsequently denied in his essay on "Freedom") that the finite as such implies the fall, he here denies that there can be any emanation of the world from God, and says that the transition can only be made by a leap, by an act, and an act of free will. The world of ideas in God becomes the *pièce de résistance* for the act of creation. The influence of Plato and Plotinus is here distinctly seen. In his "Exhibition of his Relation to Fichte" (1806), the theosophic element becomes more prominent; the Christian mystics and Boehm affect his theories and statements. He was feeling his way to the position decisively taken in the introduction to the first volume of his "Collected Works" (1809), and in the "Investigations on the Nature of Human Freedom," which forms the concluding treatise of that volume. In the preface he states that the real antagonism of philosophy is found in the two ideas of necessity and freedom. The question of sin and its origin is the capital and decisive inquiry. God is viewed as a person and a will. There still remains a "dark ground" in deity, by which to explain creation and sin, but the personal deity (he alleges in his later expositions) is the *prius* and lord of this "nature in God." Freedom in the creature is essentially the possibility of good and evil. Out of the *nexus* of cause and effect, beyond even the sphere of consciousness, each individual determines his nature by an act which, though "out of all time," is still recognized as free by the sense of responsibility and guilt. In his "Memorial" against Jacobi (1812) he denies that there can be two kinds of philosophy, and insists on the necessity of a scientific theism, which should recognize God as the absolute personality, and yet find in him the basis of all real existence. A "Reply to Eschenmayer" (in the *Allgemeine Zeitschrift*) refutes the objection that he, like Boehm, puts "Satan in God." The "Divinities of Samothrace" (1815) is a classical fragment of his mythology, somewhat arbitrary in its hypotheses. A work entitled *Die Weltalter* was cancelled while going through the press. A "Primitive Mythology" was announced in 1826, but not published. Sixteen sheets of his "Mythological Lectures" were printed in 1830, and withdrawn from circulation. Nearly 20 years had now passed since he had published any marked work—years of wrestling with the profoundest problems in search of fitting and ultimate formulas. Meanwhile Hegel had elaborated his system, with a more logical and constructive talent; introducing, by a violent fiction, a principle of movement, which was not a personal will, into the absolute being, identifying the logical process of the idea with the development of real being, and making creation itself to be the product of "the idea falling away from itself." Cousin wrote a slight

sketch of German philosophy; Beckers put it into German; and Schelling broke his long silence by writing a preface, in which he accused Hegel (whom he significantly calls *der später gekommene*) of constructing his whole scheme upon a misunderstanding of the true sense and import of the system of identity. The Hegelian system, he holds, is abstract and unreal, logic and not life, negative and rational, and not rational and positive. His own earlier works contained, he says, only the negative portion of his new system, a scheme of mere rational possibilities; but he never imagined that real being could be deduced from these abstractions. All that pure reason can give is the idea of God, but not God himself. The "first" or negative philosophy must be supplemented by the "real" philosophy, which has to do with facts, with history, and not with mere abstractions. And so, after Hegel's decease, his instructor became his successor (1841). Berlin greeted with open arms the opponent of the logical pantheism. The king, Neander, and Müller hailed him with encouragement. He was lauded as the *spiritus rector* of the century, who through philosophy was to lead philosophy back to Christ. The Hegelians accused him of recreancy to the "idea," of theosophy, of mysticism. He was belittled; he was glorified. His lectures were published, without his consent, by both Frauenstädt and Paulus. But he lectured only a few semesters, and then withdrew from public life, to perfect the details of his system. His physical constitution was of the most vigorous make, and his mental clearness was unimpaired to the last. He died in his 80th year, crowned with honor, lamented as a personal friend by the wise and the good. His first wife, Caroline Michaelis, died in 1810; his second wife, Pauline Gotter, daughter of a Gotha poet, died Dec. 13, 1854. Three sons and three daughters survive. Two of his sons, Karl Friedrich August, who has written an essay on "Protestantism and Philosophy" (1848), and Hermann, were charged with the office of preparing his works for publication. They are issued in two divisions, giving respectively his earlier and his later writings, including among the former several courses of lectures (*e. g.*, on "Philosophy," "Art," and "The Ages") not before published. Nine volumes of the first and 4 of the second division have thus far been issued. It is in the second division that we are to look for his proper philosophical legacy, the final form of his long elaborated system. And yet it is not found even here as a system, in the sense of the schools, with precise definitions and joints articulated. It is a series of lectures, of criticisms, of essays; many of them wrought out in the perfection of philosophic style, and all of them containing profound and often original criticisms on the works and ideas of the great thinkers of all times. The first of the 4 volumes which make up this division of his works contains, in 10 lectures, an analysis of

the various theories propounded for the explanation of mythology; and also an account of the negative, or purely rational part of his system, into which are interwoven some of his most finished lectures, as on Kant's "Ideal of the Pure Reason," on the dialectic method, &c. Upon this work he was still employed, completing its final revision, at the time of his decease. The 2d volume is filled with his lectures on the "Philosophy of Mythology," the 3d and 4th with those on the "Philosophy of Revelation."—Fundamental in his system, in its latest exposition, is the distinction between the negative and the positive philosophy; between the abstract and the historical; between the philosophy of the idea and the philosophy of what is real. The negative philosophy gives the logical and metaphysical basis of the whole; it is the *prima philosophia*, the first, but not the highest, philosophy; the *quid sit*, but not the *quod sit*. He reviews the old metaphysics of Plato and Aristotle, on the most abstract ideas giving a marked preference to the latter; the subtle speculations of Descartes, Leibnitz, Spinoza, and Kant, and the sceptical theories of Hume; and endeavors to fortify this purely rational science against the objections of the latter, and the criticisms of Kant. The result of the whole is the system of pure ideas—of being as such—but yet of being, not in its reality, but in its abstract and necessary possibilities. Here is his point of divergence from Hegel. Pure thought, the idea, does not give real being, nor its processes. God is not included in thought. The real, the actual, and its processes, exist only as there is personality, an absolute personality, with freedom and purpose. Philosophy is not a mere matter of deduction, from *a priori* ideas; it is also, and equally, a matter of induction—induction being here used in its widest sense, as equivalent to the dialectics of Plato. The negative philosophy gives the problems rather than the real principles of truth; though it is at the same time *a priori* in thought to the reality itself. In this negative or *a priori* philosophy, now, the object is to find the idea of true being, being itself, in its ultimate elements and analysis. And here is where the peculiarity of Schelling's scheme appears in its most subtle and abstract characteristics. Logically antecedent to being, as one of its potencies or powers, is the possibility of being (*das Seyn-Können*); then comes pure being itself (*purus actus—das reine Seyn*); and then the union of the two, as the subject-object, or spirit. These three potencies are at the basis of all, in idea; they are the potencies of absolute being, which however as a principle of development can only be grasped as absolute spirit, absolute personality, absolute will. In other words, the transition from the absolute to the relative, from the infinite to the finite, cannot be deduced from being and its predicates, but can only be achieved by a personal will. Yet in making this transition, these three potencies of being are also the

means or factors of the developing process. But in this process, we pass from the sphere of the negative to that of the positive philosophy, from the ideal to the historical, from the rational philosophy to the philosophy of mythology and of history; for Schelling finds the philosophy of man chiefly in his religious history; and Christianity in its inmost essence, he holds, is not abstract truth, but history, historic fact. This transition is made by the will of God, and not by an emanation of his nature; but still it is made by the potencies or powers of the divine nature, entering into a comparatively independent development, in the sphere of time, and there passing through a conflict (the theogonic process), before the end of creation is realized. Schelling calls his idea of God monotheism, in distinction from both theism and pantheism; in distinction from the former, which excludes God from the universal process; in distinction from the latter, not in the position that God is in some way in all being, but in denying that he is there by a blind necessity, without personal will. In the created universe, every thing is the work of the three potencies, which become distinct personalities in the process of creation, and which work for a time separately and even in collision. Thus the Trinity is, so to speak, evolved and consummated in this process; the Son is generated, not eternally, but in the beginning of creation; the Spirit, too, becomes personal in and by the historic process. The Trinity in this developing process is not a God in three Gods, but God in three personalities; at the consummation of the process, as we shall see, it takes on a still higher form. Man was created with the possibility of good and evil; against God's will he chose the evil, and became subject to temporal and eternal death; and yet the ground for this evil is also found, says Schelling, in the first of the three principles of the Divine Being, passing through the "theogonic process," in conflict with the other principles. Satan is not eternal, and is not a creature; it is a principle, a spirit, which became personal, especially in the height of the conflict with Christ. The fall is before and beyond history; the narrative in Genesis is true on the mythological standpoint. After the fall came the mythological process, through which the second divine personality passes; the whole history of mythology is not an accidental but a necessary process. Schelling in his development of it, and in connecting it with the historical development of the second person, shows originality and fertility; and his incidental descriptions and criticisms are often very beautiful. But we cannot follow him through his reconstruction of these ancient religions, the height and transition of which he puts in the mysteries. In the Old Testament he recognizes type and symbol as everywhere pointing to Christ, the Logos; mythology and Judaism unite in him. But as Christ appears in Christianity, it is in a different way from

his manifestation in mythology and Judaism; in mythology, the Son works, as it were, estrayed from God, as a natural power; in the revelation he works as a person (already such under the Old Testament), yet still united with the world estrayed from God, and bearing all human woes that he may reconcile man unto God. The person of Christ is the centre, the very substance, of Christianity. The incarnation of the Son is not a parting with the divine glory and attributes, but rather a resuming of them (because in the mythological process there was a sundering between the Son and the Father). Christ as incarnate is not from two natures (as the church doctrine declares), but in two natures; there is not a human personality, the only personality is divine. His sacrificial death was necessary to make expiation for sin; and through this death man again obtains freedom and justification. Justification precedes good works. So, too, the resurrection comes through Christ alone; without the resurrection, the soul, separate from the body, would be in an unnatural state, a state of comparative torpor. Through and by this process of redemption, the Trinity too is completed. God is no longer merely in three personalities (as in the creation), but there are now three persons, each of whom is God. Schelling also unfolds the philosophy of church history, making three stages, corresponding respectively to the apostles Peter, Paul, and John. We are now in the Pauline stadium; that of John will follow, and complete the whole. Paul is the apostle of the Son, and John of the Spirit.—Such, in a meagre outline, is the substance of the new theosophy of Schelling, which approximates at so many points to the received doctrines of the church, and yet in so many particulars deviates from it. Whether such a vital distinction as he draws between the negative and positive philosophy can be fully carried out, and how the transition is made from the one to the other, are questions which this is not the place to discuss. The whole doctrine of the divine potencies, and of the connection between these as they inhere in God and as they appear in the historical process, and the relation (if not contrast) between the latter and the Christian view of the incarnation and the Trinity, are encumbered with many difficulties. But the point of chief interest which still remains, is the process by which this large and gifted mind passed through all the stages of speculation, and ended in submission to the Christian revelation. First there was the subjective idealism of Fichte; next the discovery of reason in nature, almost deified; then the identity of the subjective and objective in the pure intellectual intuition; and, in fine, all this, it is said, yields only a negative system, a system of rational possibilities; the transition from the absolute to the finite can only be effected by a personal will; and the solution of the problems of man's history and destiny, it is asserted, can only be found in the

person and work of Christ.—Upon his system may be compared Rosenkranz, *Schelling* (1843); Michelet, *Die neueste Deutsche Philosophie* (1843); Noack, *Die Philosophie der Romantik* (1860); and the histories of philosophy by Chalybäus, Ritter, and Erdmann. Erdmann has also published a valuable sketch of his negative philosophy. Adolf Planck, in the *Deutsche Zeitschrift* (1857, afterward reprinted), gives a sketch of his later system; with which may be compared Heyder in Herzog's *Realencyclopädie*. The best account of his *Potenzlehre* is by Dörner, in the *Jahrbücher für Deutsche Theologie* (1860); in the same periodical (1859) Ehrenfeuchter gave a full outline of his "Mythology and Revelation." In Coleridge's "Biographia Literaria" will be found some account of Schelling's system in its absolute identity phase; and also a discussion of Coleridge's obligations to Schelling.

SCHEMNITZ (Hun. *Selmecz Bánya*), a town of Hungary, county of Hont, situated on a river of the same name, a tributary of the Gran, 65 m. N. by W. from Buda; pop. 20,000. It is closely hemmed in by hills, and consists chiefly of one steep and narrow street. A mining academy was established here by Maria Theresa in 1760, and now has about 200 students. The mines, which furnish gold, silver, lead, copper, iron, sulphur, and arsenic, belong chiefly to the government. They have been worked for several centuries, and were long regarded as the most important in Europe, but vary greatly in productiveness. The average annual yield of gold may be estimated at 3,600 oz., and of silver at 43,400 lbs. Below the mines is the adit of Joseph II., 12 feet high, 10 feet wide, and 10 m. long, extending from Schemnitz to the valley of the Gran, and used both as a canal and a railway.

SCHENECTADY, an E. co. of N. Y., traversed by the Mohawk river; area, 221 sq. m.; pop. in 1860, 20,002. The soil in the valley of the Mohawk is very fertile. The productions in 1855 were 293,768 bushels of oats, 44,753 of rye, 105,182 of potatoes, 105,551 of apples, 72,019 lbs. of cheese, 515,662 of butter, 16,185 tons of hay, and \$138,970 worth of broom corn. One half the broom corn crop of the state is raised in this county. There were 26 churches, 57 schools, 4 newspaper offices, 5 grist mills, and 13 saw mills. The Erie canal and the New York central railroad traverse the county.—SCHENECTADY, the capital, is situated on the S. bank of the Mohawk river and on both sides of the Erie canal, 16 m. N. W. from Albany; pop. in 1860, 9,579. It has machine shops, locomotive works, 4 foundries, a cotton factory, an agricultural implement factory, a tannery, a shawl factory, and various other establishments. The locomotive works are capable of giving employment to 600 hands. Union college, one of the oldest institutions of learning in the country, is situated here. (See UNION COLLEGE.) The city has a union school, at which there is an attendance of over 2,000

scholars daily. It is divided into several departments, varying from the primary to the classical, and is considered one of the best institutions in the state. There are 2 newspapers, 12 churches, and 2 banks. The Erie canal, the New York central, Troy and Schenectady, and Saratoga and Schenectady railroads connect the city with important points in every direction. The town was first settled by Arent Van Corlear in 1661, and a fort was built. On Feb. 9, 1690, the Indians and French massacred the inhabitants, sparing only 60 old persons and children; and in 1748 it was again taken and a large number of persons put to death. It was incorporated as a city in 1798, Albany being the only older incorporated city in the United States.

SCHÉRER, BARTHÉLEMY LOUIS JOSEPH, a general of the French republic, born near Bèfort in 1747, died at Chauny, Aug. 19, 1804. Promoted to the command of a division in 1794, he captured Landrecies, Quesnoy, Condé, and Valenciennes, and contributed to the success of Aldenhoven. He succeeded Pérignon in the command of the army of the Pyrénées-Orientales in 1795, passed soon after to the army of Italy, gained the battle of Loano, Nov. 21, was displaced by Bonaparte in 1796 for not reaping the advantages of the victory, and in 1797 was appointed minister of war by the directory. Accused of maladministration, he retired from this office in 1799, resumed command of the army of Italy, was defeated at Magnano, April 4, replaced by Moreau, and saved from an impending accusation by the revolution of the 18th Brumaire. He published two reports in defence of his conduct in 1799.

SCHIEDAM, a town of the Netherlands, province of South Holland, situated near the right bank of the Meuse where it is joined by the Schie, 4 m. W. from Rotterdam; pop. in 1850, 12,734. The streets are broad and well laid out. There are several churches, a town hall, an exchange, a concert hall, a public library, many public schools, hospitals, and charitable institutions. The principal manufactures are hardware, linen, cordage, white lead, and the gin or Hollands known by the name of the town. More than 200 distilleries are employed in making this and other spirituous liquors.

SCHILL, FERDINAND VON, a Prussian partisan officer, born at Wilmsdorf, near Dresden, in 1776, killed in Stralsund, May 31, 1809. In 1806 he was a lieutenant in the Prussian army at Auerstädt, where he was wounded. Taking refuge in Colberg, he there organized a free corps of 1,000 men, with which he effectively aided Gneisenau in the defence of that city, the only Prussian fortress not surrendered to the French. After the peace of Tilsit he was made a major, and his band was converted into a regiment of the guard and assigned to garrison duty in Berlin, his entry into which was marked by a popular ovation. He was affiliated with the *Tugendbund*, and on April 28, 1809, war having broken out between France and Austria, marched his regiment out of Berlin, ostensibly

for military exercise. But instead of returning, he proceeded toward Saxony, where he expected coöperation in his scheme of bringing about a general rising against the French. At Halle, however, he heard of Napoleon's victories and of the suppression of Dörnberg's insurrection in Hesse, and endeavored to reach Hanover, hoping to get to England. Ten thousand francs were offered for his head by the king of Westphalia. On May 5 he fought a detachment from the garrison of Magdeburg at Dodendorf, and then turned toward the Baltic, reaching Wismar and Rostock, and finally, with a force increased to several thousand men, fighting his way to Stralsund, which he hastily strengthened. On the 31st the place was taken by an overpowering Dutch and Danish force after a desperate resistance. Schill himself was slain, and 12 of his officers taken here and at Dodendorf were shot by the French at Wesel. A fragment of his corps found their way back to Prussia, where their officers were tried by court martial and degraded; but the expedition had a powerful effect in arousing the martial spirit of the Prussians. Schill's head was preserved in spirits and presented to Burgman of Leyden, and in 1837 was buried at Brunswick with the remains of some of his officers, over which a monument was raised. His life has been written by J. O. L. Haken (2 vols., Leipsic, 1824), and Heinrich Döring (Barmen, 1838).

SCHILLER, JOHANN CHRISTOPH FRIEDRICH VON, a German poet, dramatist, and historian, born in Marbach, Würtemberg, Nov. 10, 1759, died in Weimar, May 9, 1805. His father, Johann Caspar Schiller, had been in the military service of the duke of Würtemberg during the 7 years' war, and after the peace of Paris was retained on the ducal establishment in various civil capacities, the planning and care of the pleasure grounds at Ludwigsburg and Solitude being in particular intrusted to him. Both he and his wife were simple-minded, pious persons, duly impressed with the divine rights of kings, and more particularly of their sovereign, the duke of Würtemberg. Friedrich was intended for the church, and in his childhood evinced no remarkable intelligence. By the Stuttgart commission, who examined candidates for the ministry, he was designated simply as *puer bonæ spei*, a boy of good promise. The plans of his parents and his own wishes were, however, somewhat rudely dashed by his enrollment at the age of 14 in a free seminary for certain branches of professional education just established in Stuttgart by the reigning duke, whose invitation to Schiller to accept the benefits of the institution was equivalent to a command. The 6 years which he passed in this establishment were the most harassing and comfortless of his life. The process of teaching and living was conducted with the stiff formality of military discipline; no deviation was permitted from the established course of study, whatever might be the temperament or capacity of the pupil; even

the amusements proceeded by rule. To a boy of ardent and impetuous temperament, as Schiller soon proved himself to be, this narrow routine was insufferable, and he solaced himself in the world of poetry and romance, reading by stealth Shakespeare, Plutarch, Klopstock, Lessing, Herder, Goethe, and many other forbidden authors. Within a year or two from entering the school he had actually written portions of an epic poem entitled "Moses," and "Cosmo de' Medici," a tragedy. At the age of 16 he received permission to exchange the study of jurisprudence, which he cordially hated, for that of medicine, accepting the latter as a choice of evils, and following it "with a rigid though reluctant fidelity." Thus secretly educating himself as a poet, and trying his strength occasionally in short flights, he reached his 19th year, when he set about the composition of his earliest surviving drama, the "Robbers." He kept the work in manuscript for a year or two, but having passed his medical examination in 1781, and received the appointment of surgeon in the ducal army, he printed it at his own expense, no bookseller venturing to undertake the risk. Its publication produced an extraordinary feeling in the literary world; translations appeared in almost all the languages of Europe, and over young men its wild, impassioned eloquence exercised a singular fascination, although it is not true that persons of rank and fortune, as was currently reported at the time, were induced by the perusal of it to become amateur outlaws. Schiller himself in a maturer age characterized it as "a monster for which fortunately the world had no original," adding that his chief fault was in "presuming to delineate men two years before he had met one." That a work of so dangerous and revolutionary a character should emanate from his orderly academy greatly amazed the duke of Württemberg, who, after reproaching the author with his want of literary merit as well as of moral intelligence, peremptorily ordered him to confine himself thenceforth to his medical duties, and under no circumstances to write any more poetry. This fresh attempt to shackle his intellectual freedom depressed and alarmed Schiller, but could not divert him from his purpose. He continued to write in secret, and even ventured to go incognito to Mannheim and witness the first representation of his tragedy, which, at the request of the baron von Dalberg, superintendent of the theatre in that city, he had remodelled for the stage. He was discovered and placed under arrest, and upon venturing to repeat the offence was threatened with more rigorous measures. Chafing under this petty tyranny, he availed himself of the confusion created in Stuttgart by the visit of a foreign prince, and, in Oct. 1782, made his escape to Mannheim, where he was kindly received by Dalberg. Fearful however of remaining so near Stuttgart, he passed soon after into Franconia, and found an asylum in the house of

Madame von Wolzogen, whose sons had been his fellow students, and who knew him also through his writings. He was invited to Mannheim in Sept. 1783, as poet to the theatre, a post which it had been his long cherished desire to occupy, and the duties of which he immediately entered upon. At the same time he became a naturalized subject of the elector palatine, and was thus relieved of all fears of the duke of Württemberg. He remained at Mannheim 18 months, producing in that time a translation of Shakespeare's "Macbeth," and two new dramas, *Fiesco* and *Kabale und Liebe*. He also established the *Rheinische Thalia*, a periodical devoted to the concerns of the stage, and in which he published several acts of a new drama in blank verse, *Don Carlos*, and a number of original poems. The *Philosophische Briefe*, written about this time, paint the struggles of an enthusiastic and inquisitive spirit to solve the mystery overhanging the destiny of the human race. Anxious for a wider sphere of action than Mannheim afforded, he repaired in March, 1785, to Leipsic, where he finished *Don Carlos*, and thence after a few months went to Dresden. The new drama greatly enhanced his reputation, but he nevertheless turned his attention to other enterprises, and for a year or two occupied himself chiefly with conducting the *Thalia* and the composition of lyric poetry. While wavering among a multiplicity of plans for the future, he produced the prose fragment entitled the *Geisterseher*, published in English as the "Ghost Seer;" after which, becoming tired of fictitious writing, he set about a history of the "Revolt of the Netherlands," a subject suggested to him during the composition of *Don Carlos*, and which he had then to some extent studied from original sources. The first volume of the work, carrying the narrative down to the arrival of Alva in Brussels, appeared in 1788; no subsequent one was ever published. Schiller had meanwhile, in 1787, taken up his residence in Weimar, where, in the society of Goethe, Wieland, and Herder, he found new incentives to intellectual labor. Here too he became acquainted with Charlotte von Lengefeld, his future wife, and the summer of 1788, which he passed near the residence of her mother at Rudolstadt, was one of the happiest in his career. His acquaintance with Goethe commenced in the same year, and at the outset gave little promise of ripening into cordial friendship. Their characters, opinions, and mental culture were widely diverse; and Schiller, writing to a friend soon after the interview, says of Goethe: "His world is not my world; our modes of conceiving things appear to be essentially different. From such a combination no secure, substantial intimacy can result." On the part of Goethe, who had been endeavoring during a recent residence in Italy to train himself to greater purity and precision in all departments of art, and whose poetic susceptibilities were shocked by such productions as the

"Robbers," there existed prepossessions not less hostile. He even avoided Schiller, and resisted the efforts of common friends to bring them together. By degrees however both parties found that they had been mistaken, and there grew up between them a firm and lasting friendship, productive of important consequences in the history of both. One of the first of these was the appointment of Schiller, in 1789, partly through Goethe's interest, to the chair of history at the university of Jena. He was received with the warmest enthusiasm by the students upon entering on his new duties, and his marriage, in Feb. 1790, seemed to crown his happiness. He now devoted himself more than ever to historical studies, and in 1791 produced his "History of the Thirty Years' War," which Carlyle, writing in 1824, calls "the best historical performance which Germany could boast of." His plans for the further prosecution of his labors in this direction were however interrupted by a severe attack of illness, which rendered necessary a temporary cessation from intellectual efforts of all kinds. Although conscious that his health was permanently shattered, he indulged in no repinings; and as his strength began to return to him, he resumed his literary avocations with unabated ardor, and often, in the glow of poetical conception, almost forgot his maladies. For a while he studied the Kantian theories of philosophy, under the influence of which he produced a number of profound æsthetic essays; he then projected an epic in *ottave rime* on the career of Frederic the Great; but, conscious that the drama was the true home of his genius, he finally set about the composition of his "Wallenstein," which for upward of 7 years was the task to which he "consecrated his brightest hours and the finest part of his faculties." In the intervals of this undertaking he conducted the *Horen*, in which appeared some of his best essays and smaller poems, and which was also enriched by contributions from Goethe. The friendship of the two poets had now become firmly cemented, and in conjunction they wrote for the *Musen-Almanach*, which was also conducted by Schiller, the series of metrical epigrams called *Xenien*, directed against the attacks of the contemporary authors who looked with jealousy upon this literary duumvirate. Schiller's habits at this time were ill calculated to allay the constitutional malady which was making slow but sure encroachments upon his health. By day he read and walked abroad, enjoyed the society of his wife and children, and conversed or corresponded with his friends; but his nights were devoted to study or composition, and his labors were frequently protracted until 4 or 5 o'clock in the morning. To sustain his enthusiasm he had recourse to the excitement of wine or other powerful stimulants, the influence of which Goethe has fancied can be traced in the productions of this period. The results of such a course of life were brilliant, but

were dearly purchased by the rapid decay of health and physical strength. At length in 1799 appeared his drama of "Wallenstein," which, on account of its extreme length, as well as to give consistency and symmetry to the whole work, he divided into 3 parts, "Wallenstein's Camp," a piece in one act, serving as an introduction; "The Piccolomini," and "The Death of Wallenstein," each in 5 acts. His design, as stated by Carlyle, was "to embody the more enlarged notions which experience had given him of men, especially which history had given him of generals and statesmen; and while putting such characters in action, to represent whatever was or could be made poetical, in the stormy period of the 30 years' war." The work is on the whole his greatest performance, and has been placed by De Quincey the nearest in point of excellence to the dramas of Shakespeare; although, on account of its long digressions and other defects, it is unsuited for the stage. The paraphrase of the 2d and 3d parts by Coleridge has rendered it familiar to English readers. Soon after the publication of "Wallenstein," Schiller removed to Weimar, and about the same time he was placed permanently on the pension list of the duke of Weimar, by whom in 1802 he was ennobled. His literary activity, under the influence of the closer communion into which he was now brought with Goethe, seemed to receive a fresh stimulus, and between 1799 and 1801 he produced three new dramas, "Mary Stuart," "The Maid of Orleans," and "The Bride of Messina," beside his noble "Song of the Bell," and other poetical pieces. "The Maid of Orleans" proved to be one of the most successful of his acting plays, and at the first performance of it in Leipsic the audience greeted the author, who happened to be present, with a spontaneous shout of "Long live Friedrich Schiller!" In 1804 appeared his last, and by many considered his greatest, as it undoubtedly is his most popular drama, "William Tell." Failing in many essentials of construction and arrangement, it is nevertheless instinct with the spirit of freedom, and for picturesque beauty is unsurpassed in the whole range of dramatic literature. In the spring of 1804 Schiller suffered from a severe attack of his constitutional malady; he rallied slightly, and had begun to plan new works, when the disease returned with fatal power, and after a brief sickness he expired in a soft slumber, exclaiming shortly before his death: "Many things are growing plain and clear to me." Notwithstanding the prominence which he gave to dramatic forms, it may be doubted whether Schiller is not now better known by his ballads and lyric poems. "The primary vocation of his nature," says Carlyle, "was poetry; the acquisitions of his other faculties served but as the materials for his poetical faculty to act upon, and seemed imperfect till they had been sublimated into the perfect forms of beauty, which it is the business of this to elicit



from them." In person Schiller was tall and spare; his complexion was pale, his brow high and thoughtful, his nose aquiline, his mouth of delicate beauty, and his hair inclined to auburn. His life has been written in German by Döring, Madame von Wolzogen, Hoffmeister, Palleske (English translation by Lady Wallace, 2 vols., London, 1859), and others; and in English by Carlyle and Sir Bulwer Lytton. His correspondence with Goethe, translated by G. H. Colvert (Boston, 1845), with William von Humboldt, and with Körner, throws also much light upon his genius and character. English versions of nearly all his works have been attempted, including one by Sir Bulwer Lytton of his poems; and many of the latter have been translated in America by C. T. Brooks, J. S. Dwight, N. L. Frothingham, W. H. Furness, and others. His complete works have been published in English by C. J. Hempel (2 vols. 8vo., Philadelphia, 1861).

SCHLAGINTWEIT, ADOLF, a German savant and traveller, born in Munich, Jan. 9, 1829, killed in Kashgar in Aug. 1857. He was educated in his native city, with his brothers HERMANN (born May 18, 1826) and ROBERT, younger than Adolf, who became his collaborators. While at the university he joined with Hermann in explorations of the Alps, making original researches, and publishing the results in their *Untersuchungen über die physikalische Geographie der Alpen* (Leipsic, 1850), in the preparation of which they were aided by Alexander von Humboldt. It treated chiefly of the eastern Alps, but in 1851 they explored the western portion, visited Piedmont and Savoy, and devoted themselves especially to observations and measurements in the vicinity of Monte Rosa. They were the first to ascend the highest peak of this mountain (Aug. 23, 1851), and to make an accurate measurement of its elevation (14,284 French feet); and they remained for 14 days on its S. W. slope, at a height of 9,734 feet. In 1852 they explored the Bavarian Alps, where in 1853 also Adolf made geological observations. The results of their researches were published in *Neue Untersuchungen über die physikalische Geographie und die Geologie der Alpen* (Leipsic, 1854), a splendidly illustrated work. In the same year they produced a collection of photographs of Monte Rosa and of the principal Bavarian peak. At the death of Capt. Elliot in 1852, the magnetic survey of India which he had begun under the auspices of the East India company was left incomplete. The recommendations of Bunsen, then ambassador of Prussia in London, and of Humboldt induced the directors of the company to invite Adolf to London, and to fit out under his direction an expedition for magnetic and other scientific observations in India. He was liberally supplied with money and with the best instruments, and his brothers, equally well equipped, were to accompany him. They sailed from Southampton, Sept. 20, 1854, and reached Bombay Oct. 26. Their first object

was to determine the magnetic curves of the Indian peninsula. Adolf set out alone Nov. 5, and was joined by his brothers, who had followed a different route, at Poona, Dec. 30; they travelled together to Bellary, making frequent excursions, and then proceeded by different routes to Madras, whence they sailed to Calcutta Feb. 19, 1855. The most important result to magnetic science was a discovery of the irregularities in the element of total intensity in the district which they traversed. The isodynamic lines, which run due E. with little variation from the Arabian sea to the Indian archipelago, are violently deflected in central and southern India, and make a sharp southward curve. On March 25 Adolf and Robert started for the Himalaya mountains by way of Patna, Benares, Allahabad, and Futtehgur. They delayed for observations at Nainital, S. W. from Almora, and ascended separately to Milum, July 2. There they made magnetic investigations, observations with the barometer and theodolite, drawings and photographs, and examined the glacier of Milum, more than 10 m. long and 3,000 feet broad. The isodynamic lines there curved northward. Proceeding to the N., they crossed 4 passes, about 18,000 feet high, entered Thibet, and on July 29 reached the peak of Gunshankosor, 19,640 feet high, near the sources of the Indus, from which they had a magnificent view of the whole mountain system. While investigating the glaciers of Ibi-Gamin, the highest mountain of Thibet, they rose to an elevation of 22,260 feet, the greatest height ever reached by any European traveller. Adolf advanced to the W., obtained a view of the valley of the Sutlej, was thus enabled to correct his map of the upper Indus, and returned and descended to Masuri, Oct. 18, where he was joined by his brother. They passed Agra on their way S. to Sangur, from which point Adolf proceeded alone, reaching Madras Feb. 19, 1856. He visited Pondicherry and Calcutta, and ascended the valley of the Ganges to Simla, where he was joined in April by his brothers, Robert having meantime made an excursion to Umercountuk, and Hermann having returned from independent explorations in Sikkim and Assam. They set out together for new researches in the Himalaya, but soon took different courses, Adolf reaching Lanskar in Thibet on June 26, while his brothers proceeded across the Karakorum and Kuen-lun ranges. He went N. to the Mustali pass, 18,800 feet high, but the marauding habits of the Mohammedan tribes beyond made it unsafe for him to proceed. He therefore turned to Serinagur, the capital of Cashmere, where his brothers joined him from different directions. He again met them at Rawal-Pindi, Nov. 17. Robert then returned to Europe by way of Mooltan, Bhooj, and Bombay, and Hermann by way of Nepal and Calcutta. Adolf, having decided to pursue his researches a year longer in Thibet and Toorkistan, first examined the salt formations of the Mundi district of the

Punjab, finding many fossils identical with those of the Himalaya and Thibet, made many observations concerning the depth and temperature of fountains, then crossed the Baralacha pass into Thibet (March, 1857), and proceeded N. W. by Yarkand to Kashgar. Different accounts are given of the occasion of his death. The most probable is that in a fight between the Toorkomans and Chinese he joined himself to the former, and was slain by them in the excitement of victory because he interceded for the prisoners whom they had taken. His journal, containing 135 pages of closely written notes, was recovered in Sept. 1861, by Lord William Hay, civil commissioner in Cashmere. The last entry in it was dated Aug. 11, 1857, just before his death. It describes a region never visited by any other scientific traveller. The whole extent of the travels of the brothers Schlagintweit was about 18,000 miles. They were almost constantly opposed by the prejudices of the orientals against Europeans, and by a prevalent belief that travellers were but the forerunners of armies. In Nepal they were obliged to seek unfrequented routes, and were once turned back; and in Toorkistan and Chinese Tartary they had to disguise themselves as Hindoos, and hide their instruments. Among their collections are about 2,000 minerals and fossils, a large herbarium, zoological and ethnographical specimens, embracing 275 casts of the faces and 37 of the hands and feet of the tribes which they visited, and an atlas of 750 original views, many of them of rare beauty. Reports of their travels were sent to Col. Sykes, president of the royal Asiatic society, and published during their absence in the principal geographical journals of Europe. The surviving brothers are preparing a complete narrative entitled "Results of a Scientific Mission to India and High Asia, undertaken between the Years 1854 and 1858; with an Atlas of Panoramas, Views, and Maps" (vol. i., Leipsic and London, 1861), the whole work to form 9 volumes 4to.

SCHLATTER, MICHAEL, the first missionary sent to America by the Reformed synods of Holland, born in St. Gall, Switzerland, July 14, 1716, died near Philadelphia in Oct. 1790. He was educated at St. Gall, became a clergyman, and in 1746 offered himself to the synods of North and South Holland as a missionary to the German Reformed emigrants in Pennsylvania. From 1746 to 1751 he labored as pastor of the Reformed churches of Philadelphia and Germantown, at the same time visiting the scattered Germans in Pennsylvania, New Jersey, Maryland, and Virginia, and providing for them settled pastors. He effected the organization of the synod of the German Reformed church in America in Sept. 1747. In 1751 he revisited Europe, and secured the services of 6 other ministers for the American churches. In 1755 he became superintendent of the charity schools established among the Germans of Pennsylvania by an association in England.

In 1757 he accompanied an expedition to Nova Scotia against the French as chaplain to the royal American regiment of foot. When the revolution broke out he espoused the cause of the colonists, and was consequently imprisoned in 1777.

SCHLEGEL, AUGUST WILHELM VON, a German philologist and critic, born in Hanover, Sept. 8, 1767, died in Bonn, May 12, 1845. He was the 3d son of Johann Adolf Schlegel, an eminent theologian, and was sent at the age of 18 to the university of Göttingen, where he devoted his time chiefly to philology. His classical learning was praised by Voss and Heyne, and under the influence of Bürger, to whose *Akademie der schönen Künste* he was a contributor, he cultivated poetry with considerable success. German literature is said to have been indebted to him for the introduction of the sonnet. In 1797 he was appointed professor of humanities at the university of Jena, and in the same year he commenced a translation of the dramatic works of Shakespeare, which was completed by Tieck (9 vols., Berlin, 1797-1810). He remained in Jena until 1802, contributing in the interval to the *Athenæum*, edited by his brother Friedrich and himself, and the *Musen-Almanach*, many articles in support of those views of literature which characterize the modern German romantic school in contradistinction to that founded on classical models. In 1800 appeared an edition of his poems, and in 1801 he published a collection of his own and his brother Friedrich's miscellaneous writings, under the title of *Charakteristiken und Kritiken* (2 vols., Königsberg). In 1802 he repaired to Berlin, and delivered a course of public lectures on the literature and fine arts of the age; at the same time he published specimens of the dramatic and poetical literature of southern Europe, and contributed literary and critical articles to various periodicals. Having been invited by Mme. de Staël, during her visit to Berlin in 1805, to direct her studies and those of her children in German literature, he accompanied her on an extensive tour through Europe, and at her suggestion wrote a critical comparison between the "Hippolytus" of Euripides and the *Phèdre* of Racine, which, despite of its severity toward the French dramatist, gained him many admirers in Paris. In 1808 he delivered at Vienna a course of lectures on dramatic art, which were subsequently published in 3 vols. (Heidelberg, 1809-'11), and have proved the most popular of his works. He continued with increased ardor to advocate the principles of the new school to which he had allied himself, recording his opinions in the *Deutsches Museum*, a journal conducted by the brothers Schlegel, and commonly regarded as the organ of the romanticists. Visiting Stockholm in 1812, he was appointed by Bernadotte, the crown prince, his secretary; but after the occupation of Paris by the allies in 1814, he retired to the country seat of Mme. de Staël, with whom he remained until her death.

in 1818. Soon afterward he was ennobled by Bernadotte. In 1819 he accepted the chair of history in the newly created university of Bonn, although he had never written a word of history, and had devoted no attention to the subject. He consequently did nothing worthy of himself in this capacity, but by a foolish critique on Niebuhr's "Roman History" rather injured his literary reputation. About this time he commenced the study of Sanscrit, and founded the *Indische Bibliothek*, a review devoted to Indian languages and antiquities. His contributions to oriental literature consist of the *Ramayana*, with a Latin translation and critical notes (Bonn, 1825), and the *Bhagavat-Gita*. His poetical career terminated with the acceptance of the Bonn professorship, and during the remainder of his life he occupied himself, apart from his oriental studies, chiefly with critical or philological works, among the latest of which were his *Réflexions sur l'étude des langues Asiatiques* (1832), addressed to Sir James Mackintosh, and *Essais littéraires et historiques* (Bonn, 1842). His printed works, the most important of which only have been mentioned, amounted to 126, and he left also a number of manuscripts. As a lyric poet he attained a high rank, and his minor pieces are polished to the last degree of refinement. In translating Shakespeare, however, this fastidiousness of taste has occasionally marred what is in other respects an admirable performance. His reputation rests mainly on his oriental writings and his critical and æsthetical essays. He was a man of courtly manners and of immoderate vanity.—FRIEDRICH KARL WILHELM VON, brother of the preceding, born in Hanover, March 10, 1772, died in Dresden, Jan. 12, 1829. He was intended for a mercantile career, but, evincing a passion for literature, was permitted to pursue his studies at the universities of Göttingen and Leipsic. At the age of 21 he was deeply learned in the literature of ancient Greece and Rome, and his earliest publications were devoted to this subject. These include "The Greeks and Romans" (Hamburg, 1797), and "History of Greek and Roman Poetry" (Berlin, 1798), the latter of which was never completed. He also projected with Schleiermacher a translation of Plato, but abandoned the undertaking to his coadjutor almost at the outset, and participated with his brother August Wilhelm, through the columns of the *Athenæum* and elsewhere, in the creation of the new romantic school of German literature. In 1799 appeared the first volume of his novel *Lucinde*, which, notwithstanding the commendation of Schleiermacher and others, was so severely criticized for its attempt to idealize sensuality, that the author never completed it. Establishing himself soon after at Jena as a *Privatdocent*, he lectured with great success on philosophy, and became a contributor, particularly of poems, to the periodicals. With a view of studying the oriental languages, and the literature and arts of southern Europe,

he repaired in 1802 to Paris, where during a residence of several years he wrote a treatise on the "Language and Wisdom of the Indians" (Berlin, 1808), one of the earliest of its class published in Germany, various works illustrating the poetry and history of the middle ages, and a series of letters on the different schools and epochs of Christian painting. The study of mediæval literature had meanwhile produced a change in his views of religion as well as of literature; and in 1808, in company with his wife, a daughter of the philosopher Mendelssohn, he embraced the Roman Catholic faith at Cologne. A collected edition of his poems published in Berlin in the following year, and including his epic, *Roland*, gave evidence of the intensity of his admiration of the arts and social and religious life of the middle ages. In 1809 he received the appointment of imperial secretary at the headquarters of the archduke Charles, and in this capacity prepared several proclamations intended to inspire a national feeling among the Germans. Subsequently he delivered at Vienna and elsewhere courses of lectures on modern history and the history of literature, by the latter of which he is perhaps best known out of Germany. Between 1812 and 1818 he was much employed in political and diplomatic business, and the remainder of his life was devoted to literary pursuits, including lectures on the philosophy of life, the philosophy of history, and the philosophy of language. The last named course, commenced in Dresden in the latter part of 1828, was interrupted by his death. His critical writings are the most esteemed of all his productions. A complete edition of his works has been published at Vienna in 15 vols., and translations of his lectures on modern history, and on the philosophy of life, of language, and of history, and other works, form 5 volumes of Bohn's "Standard Library."

SCHLEIDEN, MATTHIAS JAKOB, a German botanist, born in Hamburg, April 5, 1804. He was educated at Heidelberg, and in 1839 became professor in the university of Jena. His principal work is entitled *Grundzüge der wissenschaftlichen Botanik* (2 vols., Leipsic, 1842-'3; translated into English by Dr. Lankester, London, 1849); in consequence of the views expressed in this, he was involved in controversies with Liebig, Hartig, Nees von Esenbeck, and others. Another work, *Die Pflanze und ihr Leben* (5th ed., Leipsic, 1855; translated by Professor Henfrey, London, 1848), is a very popular work on natural history.—His brother RUDOLF has been the minister resident of Bremen at Washington since 1853.

SCHLEIERMACHER, FRIEDRICH DANIEL ERNST, D.D., a German divine, philosopher, and philologist, born in Breslau, Nov. 21, 1768, died in Berlin, Feb. 12, 1834. His father was a German Reformed minister, then chaplain of a Prussian regiment in Silesia; his mother was the daughter of the Rev. Mr. Stubenrauch, likewise of the Reformed communion.

To his mother, a very intelligent and pious woman (as her few letters embodied in Schleiermacher's correspondence abundantly prove), he confesses himself mainly indebted for his early training, his father being frequently absent on professional journeys. Subsequently the family removed to the country, where he lived from his 10th to his 14th year, mostly under the instruction of his parents and of a teacher who first inspired him with an enthusiasm for classical literature and literary fame. At that time he had already commenced the struggle against a "strange scepticism," which he calls a "peculiar thorn in the flesh," and which made him doubt the genuineness of all the ancient authors. In 1783 his parents, while on a journey, became acquainted and favorably impressed with the educational establishment of the Moravians at Niesky, in Upper Lusatia, and left him together with his brother and sister under the care of this excellent religious society. Two years afterward he was sent to the Moravian college at Barby. The child-like piety, the wise mixture of instruction and amusement, and the rural quietness of these institutions pleased him very much. He ever remembered with gratitude and pleasure the time he spent there, and kept up a familiar intercourse with the society through his sister Charlotte (who had become one of its regular members), and through his intimate friend and classmate, Von Albertini, subsequently bishop of the fraternity and a distinguished hymn writer. The type of Moravian Christianity left an abiding impression on his heart, which may be clearly traced in the strongly Christological character of his dogmatic system. But his constitutional scepticism, stimulated rather than weakened by the innocent orthodoxy inculcated at Barby, seriously tormented him by doubts concerning the vicarious atonement of Christ and the eternal punishment of the wicked, and led to a temporary rupture with his teachers and even with his father, who was deeply pained at the sad news. The correspondence between the father and son, recently published, is highly honorable to both. With all his filial reverence and affection, the latter refused to yield to mere authority, and insisted on his right of private judgment and personal investigation. The father learned to respect the manly independence and earnest mental struggles of the son. Both were at last fully reconciled. With the consent of his father he left Barby and entered the university of Halle in 1787, where he lived in the house of Prof. Stubenrauch, a brother of his mother, who had died some years previously (1783). His studies were rather fragmentary. He attended the lectures of Semler, the father of German neology, and of Wolf, the celebrated Greek scholar, made himself acquainted with modern languages and mathematics, and read the philosophical works of Spinoza, Kant, Fichte, and Jacobi. His mind was very impressible, yet too independent to follow any

one teacher or system. The age was strongly sceptical, and German theology in particular was then undergoing a revolution as radical as the political revolution of France. He left the university after a two years' course without a fixed system of religious opinions, yet with the hope of "attaining, by earnest research and patient examination of all the witnesses, to a reasonable degree of certainty and to a knowledge of the boundaries of human science and learning." In 1790 he passed the examination for licensure, and through the influence of his kind patron, the Rev. Mr. Sack, chaplain to the king of Prussia, he received a situation as private tutor in the family of Count Dohna, where he spent 3 years and received his first polish in intercourse with refined and noble-minded women; for until that time he was quite unacquainted with the world. In 1794 he took holy orders and became assistant to his uncle, a superannuated clergyman at Landsberg on the Warta.—In 1796 Schleiermacher was appointed chaplain at the Charité (hospital) in Berlin, and continued in this position till 1802. During these 6 years he moved mostly in literary and cultivated circles, and identified himself temporarily with the so called romantic school of poetry as represented by Friedrich and Wilhelm Schlegel, Tieck, and Novalis. This connection tended to cultivate his taste and stimulate his mind, but was by no means favorable to a high-toned spirituality and moral earnestness. In 1799 he published his first important work, the "Discourses on Religion, addressed to educated Men among its Despisers" (*Reden über die Religion an die Gebildeten unter ihren Verächtern*). It had a stirring effect upon the rising generation of theologians (as Neander and Harms from different standpoints testify from their own experience), and marks the transition of German theology from an age of cold speculation to the restoration of positive faith. He appears here as an eloquent high priest of natural religion in the outer court of Christian revelation, to convince educated unbelievers that religion, far from being incompatible with intellectual culture, as they thought, was the deepest and the most universal want of man, different from knowledge and from practice, a sacred feeling of relation to the Infinite, which purifies and ennobles all the faculties. Beyond this he did not go at that time. His piety was of a very general and liberal character, and strongly tinged with the pantheism of Spinoza. His "Monologues" followed in 1800, a self-contemplation in the face of the world, and a description of the ethical ideal which floated before his mind, and was evidently influenced by the subjective idealism of Fichte. In 1802 he broke loose from his æsthetic and literary connections, much to his own benefit, and removed for two years to Stolpe in Pomerania as court preacher. There he commenced his translation of Plato, which he had projected with Friedrich Schlegel in Berlin. The completion

of this great undertaking in 6 vols. (1804-'26) gives him a place among the best Greek scholars in Germany. His searching "Criticism of all former Systems of Moral Philosophy," which opened a new path in this science, belongs to the same period (1803). In 1804 he was elected extraordinary professor of philosophy and theology in Halle. After the temporary suspension of this university in 1806 he spent some time on the island of Rügen, then returned to Berlin as minister of Trinity church, and married the widow of his intimate clerical friend Willich (1809), with whom, notwithstanding the great disparity of age (he might have been her father), he lived happily to the close of his life. When the university of Berlin was founded in 1810, in the organization of which he took an active part, he was elected its first theological professor, and continued in this position, combining with it his pastoral labors in Trinity church, during the remaining 24 years of his life. As academic teacher he lectured two hours a day on almost every branch of philosophy and theology, with perfect mastery over thought and style. In connection with Neander, his former pupil in Halle, and since 1813 his colleague, he was for a quarter of a century the great theological luminary of Berlin, and attracted students from all parts of Germany and Switzerland. As a preacher he gathered around him in Trinity church every Sunday morning the most intellectual audiences, students, professors, officers, and persons of the higher ranks of society. Wilhelm von Humboldt says that Schleiermacher's speaking far exceeded his power in writing, and that his strength consisted in the "deeply penetrative character of his words, which was free from art, and the persuasive effusion of feeling moving in perfect unison with one of the rarest intellects." He never wrote his sermons, except the text, theme, and a few heads, but allowed them to be taken down by friends during delivery and published after some revision by his pen. Beside his regular professional duties as preacher, professor, and member of the Berlin academy of sciences, he took an active part in the most important movements of his country and age. During the most critical and depressed period in the history of Prussia, he exerted a powerful influence in the pulpit and chair and through the press to stir up in all classes of society that pride of nationality and love of independence which resulted in the war of liberation and the final emancipation of Germany from French rule. He adhered to his liberal political principles during the period of reaction in favor of absolutism, which set in after the fall of Napoleon and the congress of Vienna (1815), and subjected himself to strong suspicion in high quarters, so that he expected for some time to lose his professorship and to become a political exile like his friends De Wette and E. M. Arndt. The storm however blew over, and he retained

his post, although he never sought and never enjoyed the favor of King Frederic William III. beyond the grant, a few years before his death, of the order of the red eagle, which he never wore. He assisted in the work of the union of the Lutheran and Reformed confessions in Prussia at the tercentennial celebration of the reformation (1817), and defended the union against its enemies, although he regarded himself as belonging rather to the Reformed type of Protestantism, and defended in his own way even the Calvinistic scheme of a double predestination as preparatory to an ulterior design of an ultimate universal salvation. "Christ," he said, "is the quickening centre of the church. From him comes all, to him all returns. We should therefore not call ourselves Lutheran or Reformed, but Evangelical Christians after his name and his holy gospel; for in our name our faith and our confession ought to be made known." He favored strongly the introduction of the presbyterian and synodical form of government. He was one of the compilers of the new Berlin hymn book (1829), which with all its defects opened the way for a hymnological reform which has since gone on in all parts of Germany. Notwithstanding this extraordinary activity, he mingled freely in society, and was the centre of a large number of friends at his fireside. He was small of stature, and slightly deformed by a humpback; but his face was noble, earnest, sharply defined, and highly expressive of intelligence and kindly sympathy; his eye keen, piercing, and full of fire; his movements quick and animated. In his later years his white hair made him appear like a venerable sage of olden times; yet his mind retained its youthful vitality and freshness to the close. He had a perfect command over his temper, and never lost his calm composure. In the beginning of Feb. 1834, he was seized by a severe cold which fell on his lungs, and in a few days terminated in death. It was felt throughout all Germany that a truly representative man and one of the brightest luminaries of the age had departed. The funeral orations of Steffens, Strauss (the court preacher), and Marheineke (his antagonist in theology) gave public expression to the universal esteem and regret. His literary remains were intrusted to his friend and pupil Dr. Jonas. From them as well as from numerous manuscripts of students a complete collection of his works has been in course of publication since 1835.—His productions, including the posthumous publications from his lectures, embrace classical philology (his masterly translation of Plato with comments), philosophical ethics, dialectics, psychology, politics, pedagogy, church history, hermeneutics, Christian ethics, dogmatics, practical theology, sermons, and a large number of philosophical, exegetical, and critical essays. The Old Testament alone was excluded from his lectures. His crowning merits, however, belong to theology, and his maturest production both as to contents and artistic form

is his "Dogmatics" (*Der Christliche Glaube*), first published in 1821 in 2 vols. It was here that his influence was most profoundly and deeply felt. He, however, disclaimed the honor of being the founder of a new school, and regarded it as his chief mission to arouse investigation, to suggest new paths of thought, and to awaken in every pupil the sense of his own individuality. His greatest and best disciples, as Neander, Nitzsch, Twesten, Olshausen, Lücke, Bleek, Ullmann, and others, have gone far beyond him in the direction of orthodoxy. He possessed a most strongly marked individuality as a man, a preacher, a philosopher, a divine, and a writer. He imbibed influences from Plato, Spinoza, Fichte, Jacobi, Schelling, and Calvin, but digested them thoroughly and worked them up into an original system of his own. With all his astonishing fertility of talent, however, he is a thoroughly German phenomenon, and can only be understood and properly appreciated from the peculiar condition of the German mind at the time of his first public appearance. He can be ranked neither with the rationalists nor with the supranaturalists of his generation, but sought a higher unity of both these opposite systems. He held, no doubt, many erroneous opinions; he undervalued the authority of the Old Testament; he denied the literal inspiration of the Bible, and the existence of Satan, while he believed in good angels; he revived in a modified form the Sabellian in preference to the Athanasian theory of the Trinity, and taught, like Origen, a final restoration of all mankind. He was charged with extreme subjectivism, determinism, and pantheism, although he expressly declared that the belief in a personal God was essential to prayer. But if we judge him, as we must do in justice, from the standpoint of German theology and religion at the close of the last century, he is properly regarded as a reformer, and marks the transition from rationalism and infidelity to a new and higher phase of evangelical religion. What Plato was to classic Greece, and what Origen was to the ancient Greek church, Schleiermacher was to Germany. He was a speculative Christian and a religious philosopher; and yet scientifically he kept both spheres entirely distinct. His understanding was constitutionally critical and even sceptical; but his strong religious feeling always held it in check and triumphed at last. In opposition to the one-sided intellectual theory, and the equally one-sided practical theory, which resolve religion either into mere knowledge or into mere moral action, he describes religion (first in his "Discourses on Religion," and then more clearly in his "Dogmatics") as a feeling, or immediate consciousness, and more particularly as the feeling of absolute dependence on God. Thus he vindicates to religion a peculiar department in the inmost life of the soul, and makes it independent of knowledge and philosophy on the one hand, and of action or morality on the other,

but allows it to animate and elevate both. From this point of view he develops in his "Dogmatics" the whole system of Christian faith as a description of the Christian consciousness or experience determined and controlled by the vital union of the soul with a sinless and perfect Saviour, who is one with the Father, and at the same time the ideal of humanity actualized in his historical life on earth. Thus the person of Christ is with him the centre of Christian theology and Christian piety, and it is from this point in his system that the most healthy and abiding influence has gone forth upon his best disciples and upon German theology at large. Although thoroughly Protestant in his convictions, he never abused the Roman Catholic church, but always spoke of her with dignity and respect, and exerted a stimulating influence upon some of her modern divines, as Möhler and Sandermeier. Hence the Catholic clergy of Berlin attended his funeral, and Catholic writers (for instance in Welte and Wetzzer's *Kirchenlexikon*, vol. ix.) speak of him with unusual liberality. He reduced the difference between the two types of Christianity to the famous formula: "Catholicism makes the relation of the believer to Christ to depend on his relation to the church; Protestantism makes the relation of the believer to the church to depend on his relation to Christ."—We have no biography as yet of Schleiermacher, but a rich contribution toward it in his recently published correspondence: *Aus Schleiermacher's Leben, in Briefen* (2 vols., Berlin, 1858; translated into English by Frederica Rowan, 2 vols., London, 1860). For his earlier life till 1794 we have his own autobiographical sketch, first published by Lommatzsch in Niedner's *Zeitschrift für historische Theologie*, 1851. On Schleiermacher's philosophical and theological systems there is a large number of larger works and smaller essays by Braniss (1822), Delbrück (1827), Baumgarten-Crusius (1834), Lücke (1834), Sack (1835), Rosenkranz (1836), D. F. Strauss (1839), Schaller (1844), Neander, Twesten, Hanne, Baur, Auberlen, W. Gaas, and others.

SCHLEITZ. See REUSS.

SCHLESWIG, or SLESWICK (Dan. *Slesvig*), a duchy of Denmark, bounded N. by Jutland, from which it is nearly separated by the Konge Aa river and the Kolding fiord; E. by the Little Belt and the Baltic; S. by Holstein, from which it is separated by the Eider river and the Schleswig-Holstein canal; and W. by the North sea; extreme length 100 m., breadth 75 m.; area, 3,549 sq. m.; pop. in 1855, 395,860. The shores, particularly the eastern, are indented by bays and fiords; and off the W. coast are numerous islands, shoals, and sand banks. In the interior of the country there is a slightly elevated sandy ridge, covered with heath, which increases in height toward the N. All the important rivers have a westerly course, and near the sea their banks are so low that inundations are frequent. Beside the frontier

rivers already mentioned, the chief streams are the Ribe Aae, Soholm Aae, and Treene, all tributaries of the North sea. The Witten and Gotteskog are the most important lakes, the others, though numerous, being of small extent. The soil in the interior is light and stony, and chiefly devoted to the breeding of cattle. The W. side is bordered by a strip of rich marsh land, and artificial dikes and sluices are necessary to prevent its being overflowed. The E. part of the province possesses a greater variety of soil, and is well wooded. The great dairy farms of Schleswig are situated in this part of the country. The inhabitants are a mixture of various races. The Danish language is spoken over about  $\frac{1}{2}$  of the area, and German over the greater part of the remainder; but in some localities the Frisian dialect prevails. Flensburg and Tönningen are connected by railroad, and a branch line extends to the Schleswig and Rendsburg railway, and from the latter place there is continuous communication with the principal towns of Europe. Other important towns are Hadersleben, Apenrade, Tondern, Huzum, Frederikstadt, and Eckernförde, the last of which was very conspicuous during the late "war of Schleswig-Holstein." (See DENMARK.)—SCHLESWIG, the capital, is situated at the head of a shallow bay called the Schlei or Sley, in lat.  $54^{\circ} 31' N.$ , long.  $9^{\circ} 35' E.$ , 22 m. from the Baltic, and 69 m. N. N. W. from Hamburg; pop. 11,600. It is almost surrounded by water, and is divided into three parts, Altstadt, chiefly inhabited by fishermen, the Lollfuss, and Frederiksborg. The cathedral contains many handsome monuments. There are manufactories of canvás, woollen goods, leather, lace, china, and earthenware. The harbor is only accessible to small vessels, but a considerable trade is carried on. Schleswig is an ancient city, having been in existence in 803, and for nearly 600 years it was the largest and principal commercial city of Denmark. Its decline was owing to its harbor becoming nearly filled up.

SOHLEY, a S. W. co. of Georgia, drained by branches of Flint river; area, about 200 sq. m.; pop. in 1860, 4,633, of whom 2,348 were slaves. It has been recently formed from Marion co. Capital, Ellaville.

SCHLICK, or SCHLIK, FRANZ, count, an Austrian general, born in Prague, May 23, 1789. He is of a noble Bohemian family, and was destined by his father for a diplomatic career; but he preferred the profession of arms. He evinced his devotion to the cause of the emperor Francis by raising 8 companies upon his Bohemian estates, and at the breaking out of the war of 1809 entered the army as lieutenant in the regiment of Albert cuirassiers, and rose to the rank of captain, which he resigned when in 1812 Austria went into alliance with France against Russia. When war was declared against Napoleon in 1813, he took an active part in the campaign, but, leading at Wachau a body of Russian dragoons to the at-

tack, received a wound in the head, through which he lost his right eye. In 1815 he was major in a division of light troops. During the long peace which followed he rose to the rank of lieutenant field marshal, and colonel of the 4th regiment of hussars. After the Vienna revolution of 1848 he became commandant at Cracow, and at the end of November was appointed commander of an independent corps, with which he entered Hungary from the N., twice defeated the Hungarians before Kaschau (Dec. 11, 1848, and Jan. 4, 1849), and after having been in his turn repeatedly defeated by Klapka (Jan. 22, 23, 31), and suffered a considerable loss from the vanguard of Görgey (Feb. 5), succeeded by a bold flank movement in uniting his troops with those of Windischgrätz on the eve of the battle of Kápolna (Feb. 26, 27). He was subsequently engaged in the other operations of the Hungarian war, and after its close became commandant of the second division of the army, and commanding general in Moravia. In 1854 he became commander of the 4th division of the army, stationed in Galicia. In May, 1859, he was transferred with this division to the Adriatic coast, and was subsequently called to take the command of the right wing of the army in Italy, and in this capacity acted at the battle of Solferino, where his conduct provoked much censure.

SCHLOSSER, FRIEDRICH CHRISTOPH, a German historian, born in Jever, Nov. 17, 1776, died in Heidelberg, Sept. 23, 1861. He was educated at Göttingen, and taught for some years in private families. In 1807 he published *Abälard und Dulcin* (Gotha), and afterward *Leben Beza's und des Peter Martyr Vermili* (Heidelberg, 1809). In 1808 he became co-rector in the school at Jever, but gave up this position in 1809, as it interfered with his historical studies, and went to Frankfort-on-the-Main, where he wrote his *Geschichte der bilderstürmenden Kaiser des oströmischen Reichs* (1812). In 1812 he was made professor in the newly founded lyceum at Frankfort, in 1814 city librarian, and in 1817 professor of history at Heidelberg. His most remarkable work is his "History of the Eighteenth Century, and of the Nineteenth till the Overthrow of the French Empire" (8 vols., Heidelberg, 1823-'46), which has been translated into English by D. Davison (8 vols., London, 1843-'52). Beside this he wrote *Universalhistorische Uebersicht der Geschichte der alten Welt und ihrer Cultur* (3 vols., Frankfort, 1826-'34), and *Weltgeschichte in zusammenhängender Erzählung* (9 vols., 1817-'24). The *Weltgeschichte für das Deutsche Volk* (vols. i.-xv., 1844-'55) is partly written by Schlosser himself, and partly elaborated after his works by Kriegg. Schlosser's last work is *Studien über Dante* (1856).

SCHLÖZER, AUGUST LUDWIG VON, a German historian, born at Jagstadt, in Hohenlohe-Kirchberg (now in Württemberg), July 6, 1737, died Sept. 9, 1809. He studied at Wittenberg and Göttingen, taught for a time in a Swedish



family, and in 1761 became literary assistant to Müller, the historiographer of the emperor of Russia, and a tutor in his family. In the following year he became teacher in a public academy, and in 1764 was offered a professorship at Göttingen; but through the influence of Müller, with whom he had quarrelled, an order was procured from the czar forbidding him to leave the country. In 1765, however, he obtained the chair of Russian history in the academy of St. Petersburg, and in 1767 accepted the professorship of political science at Göttingen, which he held for about 40 years. He was ennobled by the czar Alexander in 1804, and received the title of privy councillor of justice. His principal works are the *Allgemeine nordische Geschichte* (2 vols., Halle, 1772), and his German critical edition of the chronicle of the Russian monk Nestor (5 vols., Göttingen, 1802-'9). Valuable contributions to the political history of his time are contained in his *Briefwechsel* (10 vols., Göttingen, 1776-'82), and *Staatsanzeigen* (18 vols., Göttingen, 1782-'93). —His daughter DOROTHEA (born 1770, died 1825), distinguished herself by rare scholarship, and received the degree of doctor from the university of Göttingen. Her brother CHRISTIAN (died 1831) wrote a life of his father (2 vols., Leipsic, 1828).

SCHMALKALDEN. See SMALCALD.

SCHMELLER, JOHANN ANDREAS, a German philologist, born in Tirschenreuth, Upper Franconia, Aug. 6, 1785, died in Munich, July 27, 1852. In 1804 he was travelling in Switzerland, when he was induced to join a Swiss regiment in the Spanish service, and continued in military service in various parts of Europe until 1815. In 1827 he became professor in the school of cadets at Munich, and in 1828 extraordinary professor of the ancient German language and literature in the university of that city. His most important works are: *Die Mundarten Baierns* (Munich, 1821), and *Bairisches Wörterbuch* (4 vols., Stuttgart and Tübingen, 1827-'36). His *Cimbrisches Wörterbuch* was edited after his death by Bergmann (Vienna, 1855).

SCHNEIDER, JOHANN GOTTLÖB, a German philologist and naturalist, born near Wurzen, Saxony, in 1750, died in Breslau, Jan. 12, 1822. He studied at Leipsic, and after several years of great poverty was employed by Brunck at Strasbourg in 1774 to assist him in his edition of the Greek poets. He became in 1776 professor of philology and eloquence in the university of Frankfurt-on-the-Oder, removing to Breslau when that institution was transferred thither in 1811. From 1816 until his death he was chief librarian of the university. Among his philological and critical works are annotated editions of Anacreon, Pindar, Ptolemy, Aristotle's "Natural History," the Orphic hymns, Demetrius Phalereus, Ælian, Xenophon, Nicander, Theophrastus, and Oppian. He published also a Greek and German lexicon, and in German a number of works on natural history.

SOHNETZ, JEAN VICTOR, a French painter, born at Versailles, April 14, 1787. He was a pupil successively of David, Gros, and Gérard, and obtained a gold medal at the exhibition of 1819 for his pictures of "The Good Samaritan" and "Jeremiah weeping over the Ruins of Jerusalem." He then visited Italy, and painted several striking Italian scenes, as "A Brigand's Wife fleeing into the Campagna of Rome," "The Pilgrims Asleep," and "The Vow to the Madonna." His "Gipsy foretelling the Future of Sixtus V." had already given him a high reputation. Among his large historical paintings are "The Sack of Rome by the Constable de Bourbon" (1835), "The Constable de Montmorency mortally wounded at the Battle of St. Denis" (1836), "The Procession of the Crusaders around Jerusalem," "The Great Condé at the Battle of Senef," and "The Combat of the 29th July at the Hôtel de Ville." He succeeded Gérard in the academy of fine arts in 1837, from 1840 to 1847 was director of the French school of painting at Rome, and after a residence of 5 years at home resumed the same position in Rome, where he still resides. In 1855 he sent to the universal exhibition at Paris a large picture of "Christ calling Little Children," for which he obtained a gold medal of the first class.

SCHNORR VON CAROLSFELD, JULIUS, a German painter, born in Leipsic, March 26, 1794. He received his art education in Rome under the influence of Cornelius and Overbeck, and in 1827 was appointed professor of historical painting in the academy of fine arts in Munich, where he also executed an important series of encaustic paintings illustrating the history of Charlemagne, Frederic Barbarossa, and Rudolph of Hapsburg, for the royal palace. Five apartments in the same building were subsequently decorated by him with frescoes and paintings of scenes from the *Nibelungenlied*. In 1846 he was appointed director of the picture gallery and professor in the academy of fine arts in Dresden. His works are in the style of the new German school, of which he is one of the most energetic and mannered followers. A series of woodcuts from his designs illustrating biblical history have been published at Leipsic and reprinted in London (2 vols. 4to., 1852).

SCHÖLCHER, VICTOR, a French writer and politician, born in Paris, July 21, 1804. He became connected as art critic with some Parisian journals, assisted with his pen and his purse some of the newspapers most determined in their opposition to the government of Louis Philippe, and devoted himself to the cause of negro emancipation, in relation to which he published in 1833 *De l'esclavage des noirs et de la législation coloniale*, embodying the results of his observations during a journey in Mexico, Cuba, and the United States. In 1840 appeared his *Abolition de l'esclavage, examen des préjugés contre la couleur des Africains et des sang-mêlés*; and in the same year he visited the West Indies, publishing after his return *Les colonies*

*Françaises* (1842), and *Les colonies étrangères et Haiti* (2 vols. 8vo., 1843). After a tour through Egypt, Greece, and Turkey, he presented a view of oriental servitude in his *Égypte en 1845* (1846). In 1847 he published *L'histoire de l'esclavage pendant les deux dernières années* (2 vols. 8vo., 1847). He visited the banks of the Senegal, the revolution of 1848 occurring during his absence, and was appointed on his return under secretary of the navy department. He immediately caused a committee to be appointed to draft a bill for the abolition of slavery in the French colonies, and the emancipation act of April 27, 1848, was the result. Elected to the legislature by both Guadeloupe and Martinique, he sat for the former island, became a prominent member of the "mountain," and on the *coup d'état* of Dec. 2, 1851, appeared in his scarf of office among the insurgents in the faubourg St. Antoine. Exiled from France, he went to England, where he published *Le coup d'état du 2 Décembre* (London, 1852); an elaborate "Life of Handel," in English (1857); and latterly an English pamphlet on the Anglo-French alliance.

SCHÖFFER, PETER, one of the inventors of printing, born in Gernsheim near Darmstadt about 1430, died in the spring of 1502. Early in life he followed the profession of a copyist at Paris, but about 1450 removed to Mentz, where he became an assistant in the printing establishment of Faust and Gutenberg, and after the dissolution of the partnership between these two became a partner of the former, and subsequently married his granddaughter Christine. The first work on which his name appears is the celebrated Psalter, printed with large cut type in Aug. 1457. Afterward, in conjunction with Faust, he published several works; and after the death of the latter, Schöffer continued the business for about 35 years. He left as his successor his son Johann Schöffer, whose name is appended to the *Mercurius Triumvistus* of 1503, and many works after that date. Schöffer was the inventor of punches, by which sharpness and finish were given to the type.

SCHOHARIE, a S. E. co. of N. Y., drained by Schoharie and Catskill creeks; area, 675 sq. m.; pop. in 1860, 34,469. A branch of the Catskill mountains occupies the S. part, and a ridge called the Helderberg mountains extends along the E. border. Iron ore, limestone, and sandstone are found, and there are sulphur springs in the N. W. The productions in 1855 were 41,719 bushels of wheat, 490,063 of oats, 87,592 of rye, 161,153 of Indian corn, 169,078 of buckwheat, 44,136 of barley, 190,432 of potatoes, 33,482 of peas, 222,182 of apples, 48,774 tons of hay, 440,754 lbs. of hops, 1,832,257 of butter, and 108,416 of wool. The county had 85 churches, 194 schools, 3 newspaper offices, 4 furnaces, 27 grist mills, and 118 saw mills. Capital, Schoharie.

SCHOLASTICISM. See NOMINALISM, and PHILOSOPHY, vol. xiii. p. 265.

SCHOMBERG, FRIEDRICH HERMANN, count, a German soldier, born in Heidelberg in Dec. 1615, killed at the battle of the Boyne in Ireland, July 1, 1690. He was the son of Count Schomberg, a high officer in the household of the elector palatine, by an English lady, Ann, of the Dudley family, and lost both his parents when only a few months old. Being a Protestant, he fought against the imperialists during the 30 years' war, alternately in the Dutch, Swedish, and French armies, and his property was confiscated by the emperor. After the peace of Westphalia he was appointed chamberlain to the young William II. of Orange. In 1650 he removed to France, and served with distinction under Turenne, receiving the brevet rank of lieutenant-general, until the peace of the Pyrénées. In 1660 he entered the Portuguese service, won the victories of Estremoz, June 8, 1663, and Villaviciosa, June 17, 1665, compelling Spain to recognize the house of Bragança, and at the conclusion of peace in 1668 returned to France and became naturalized there. Being placed in command of the French army on the Spanish frontier, he took Figueras and several other strongholds in Catalonia, and in 1675 was promoted to the rank of marshal. During the following years he commanded in Flanders, and forced the enemy to raise the sieges of Maestricht (1676) and Charleroi (1677). On the revocation of the edict of Nantes (1685) he went to Portugal, and negotiated the marriage between Pedro II. and Maria Sophia, daughter of the elector palatine Frederic William. He afterward repaired to Berlin, and in 1687 was appointed to the chief command of the army of Brandenburg and the governorship of the province of Prussia. In 1688 William III. of Orange, when about to sail for England, appointed him his second in command, "as the greatest living master of the art of war." He entered London riding by the side of the prince, and dividing with him the gaze of the multitude, introduced the most rigorous discipline among the troops, and in 1689 received from the house of commons a vote of thanks for his services, and was created duke of Leinster. A grant of £100,000 was also awarded him by parliament. In 1689 he was sent to Ireland, but, owing to the disorganized state of the army, made little headway against the party of King James. In June, 1690, he was joined by William with large reinforcements, and both marched toward the Boyne to meet the enemy. In the battle which took place on the bank of that river Schomberg fell while leading a charge.

SCHOMBERG, HENRI, comte de, a French soldier and statesman, born in Paris in 1583, died in 1632. Having attained the rank of lieutenant-general by active service in the army, he became in 1607 councillor of state, in 1608 governor of Limousin, in 1615 ambassador to England, and in 1616 colonel-general of all the German troops in the service of France. In 1619 he was named superintendent of finance and

grand master of artillery, assisted in reducing the Protestant strongholds in Languedoc and Guienne, and in 1621 became prime minister, but was displaced by Richelieu in 1624. He was raised the next year to the rank of marshal of France, expelled the English from the island of Ré in 1627, and distinguished himself during the siege of La Rochelle; took Pignerol in 1630, and forced the duke of Savoy to raise the siege of Casale; in 1632 commanded the army sent by Richelieu against the insurgents in Languedoc, on Sept. 1 defeated and took prisoner the duke of Montmorency at Castelnaudary, and as a reward was made governor of Languedoc. He published a *Relation de la guerre d'Italie* (Paris, 1630), giving an account of his last campaign in that country.—His son CHARLES, born in 1601, died in 1656, served under him in Italy and Languedoc, succeeded him as governor of the latter province, defeated the Spaniards at Leucate in 1636, received the rank of marshal, took Perpignan in 1642, and distinguished himself at the head of the army which invaded Catalonia in 1648. He acquired the title of duke by his marriage with Ann, duchess of Halluyn.

SCHOMBURGK, SIR ROBERT HERMAN, an English traveller, born in Freiburg, on the Unstrut, June 5, 1804. He came in his youth to the United States, and was for some time partner in a tobacco manufactory in Virginia. In 1830 he went almost penniless to the West Indies, and while staying on the little island of Aneгада, one of the Virgin group, was encouraged by the English governor to explore the island. He obtained much valuable information on the dangerous coasts, and laid an essay on the subject before the English geographical society, which procured him some influential patrons. In 1834 the geographical society and some botanists furnished him the means of undertaking a scientific expedition to British Guiana, where he spent 4 years, making important discoveries in the interior of the country. He published the results of his investigations in his "Description of British Guiana, Geographical and Statistical" (London, 1840), "Views in the Interior of Guiana" (1840), and reports to the geographical society, which were translated into German by his brother Otto (*Reisen in Guiana und am Orinoco*, Leipsic, 1841). Every branch of natural science has been greatly enriched by these volumes, and one new plant, first described by Schomburgk, has been called in his honor *Schomburgkia orchida*. The great *Victoria regia* lily was discovered by him on this journey. In 1840 the British government placed him at the head of a commission to survey the frontier between British Guiana and Brazil, and to make further geographical and ethnological investigations. The enterprise was commenced in 1841, and terminated in 1844. He was knighted by the queen, and received an appointment in the service of the government. In 1847 he published a "History of Barbados;" in 1848 he proposed to the

British association a plan of reducing unwritten languages to an alphabet in Roman characters; and in August of the same year he was appointed British consul and *chargé d'affaires* in the Dominican republic, with which he concluded in 1849 an advantageous commercial treaty. The geographical society received from him a number of interesting reports on the island of St. Domingo, and in 1853 on the peninsula of Samana. He has been made Ph.D. by the university of Königsberg, a knight of the red eagle by the king of Prussia, a knight of the order of merit by the king of Saxony, and a chevalier of the French legion of honor. Since 1857 he has resided at Bangkok as British consul for Siam.—OTTO, brother of the preceding, born at Voigtstädt, in Thuringia, Aug. 18, 1810, died at Buchsfelde, in South Australia, Aug. 16, 1857. He studied at the university of Halle, took an active part in the *Burschenschaft*, and on that account was imprisoned for several years in the fortress of Magdeburg. He published German translations of several works of his brother, and in 1846 commenced with Froriep the publication of a geographical journal entitled *Fortschritte der Geographie und Naturwissenschaft*. During the revolutionary movements of 1848 he was very active in promoting the efficient organization of mechanics' associations; but after the success of the counter revolution in 1849 he emigrated to Australia, where he spent the remainder of his life as a farmer, serving also a colony of German emigrants as pastor and justice of the peace.—A third brother, MORITZ RICHARD, accompanied his brother Sir Robert in 1840 to Guiana, at the expense of the king of Prussia, and with his brother Otto took part in the publication of the German account of this journey. In 1849 he embarked for Australia, whither he was afterward followed by a fourth brother, Julius.

SCHÖNBEIN, CHRISTIAN FRIEDRICH, a German chemist, born in Würtemberg, Oct. 18, 1799. In 1824-'5 he taught chemistry and physics at Reilhau near Rudolstadt. To complete his scientific education he visited England (1826) and Paris, and in 1828 was called to the university of Basel. His first experiments on the passivity of iron led to a series of voltaic and electro-chemical investigations. In 1839 he discovered ozone, and in 1845 invented gun cotton. He has of late years devoted himself to experiments with oxygen. Of his works, which have usually appeared first in periodicals, the most noteworthy are: *Das Verhalten des Eisens zum Sauerstoff* (Basel, 1837); *Beiträge zur physikalischen Chemie* (1844); *Ueber die Erzeugung des Ozons* (1844); and *Ueber die langsame und rasche Verbrennung der Körper in atmosphärischer Luft* (1845).

SCHÖNBRUNN, a village of Lower Austria, about 2 m. S. W. from Vienna, on a small affluent of the Danube. It is the site of the emperor's summer palace, a large building, surrounded by a beautiful park containing bo-

tanical and zoological gardens. It was occupied by Napoleon in 1805 and 1809. The peace of Presburg was ratified here in the former year, and the peace of Vienna concluded here in the latter. Napoleon's son, the duke of Reichstadt, died here in July, 1832.

**SCHOOL BROTHERS AND SCHOOL SISTERS**, the collective name of the numerous religious congregations in the Roman Catholic church, which devote themselves to the instruction of youth. The most important of them are the "Brethren of the Christian Schools," founded in 1679 by La Salle. (See **BRETHREN OF THE CHRISTIAN SCHOOLS**.) Among the other male congregations of this class the following deserve to be noticed: 1. The "Congregation of Christian Instruction," founded in 1820, in Brittany, by the abbé Jean de Lamennais, a brother of the celebrated author, principally for taking charge of the primary schools in such localities as were unable to support two brethren at a time, and for this reason were debarred from the services of the brethren of the Christian schools of La Salle. They had in 1860 upward of 100 establishments with more than 600 members, mostly in France. 2. The "Brothers of Christian Instruction," founded in 1821 by the abbé Coindrin at Puy in France, had in 1860 about 300 members in 50 establishments, of which 3 (Mobile, Dubuque, and Shieldsborough, Miss.) are in the United States, and all the others in France. 3. The "Christian Brothers of the Society of Mary" (*Frères Maristes*), founded in 1816, by the abbé Chanisnade and some other priests, in the diocese of Bordeaux, had in 1853 1,665 members and 336 houses, of which 3 were in the United States (Cincinnati, San Antonio, and Pittsburg), 1 in Scotland, 1 in Austria, 1 in New Caledonia, and the others in France. 4. The "Christian Brothers," founded by the Rev. E. Rice, at Waterford, Ireland, have a superior-general at Dublin, and in 1860 had 51 establishments in Ireland, 9 in England, and several more in the British possessions in India and Australia. They conduct in all 180 schools, in which over 21,000 children and adults receive a religious and secular education. 5. Two congregations of "Brothers of St. Joseph," the one founded in 1816 in Belgium and still confined to that country, the other founded in 1821 by the abbé Dugarié, and later united with the "Congregation of the Holy Cross," which has a number of institutions in France and several in the United States (in the dioceses of Chicago and Fort Wayne).—Beside the congregations here enumerated there are several minor ones, which occupy themselves solely or mostly with the instruction of youth. In France alone there were in 1849 25 congregations, which together had charge of 7,590 schools. In the United States there were in 1860, beside the congregations already mentioned, the "Xaverian Brothers" in Louisville since 1854, and "Brothers of the Holy Family" in the diocese of St. Paul, Minn. In several non-Christian countries, as Syria, China, &c., congregations of native

school brothers have been organized by the missionaries.—The number of female associations which have been established solely or chiefly for the purpose of conducting schools is much larger than that of the male congregations. France alone in 1843 had 85 different congregations, having charge of 8,300 schools. The following are among those having the largest number of members: 1. The "Congregation of Nevers," confined to France, and comprising in 1860 about 2,000 sisters in 245 establishments. 2. The "Congregation of Nancy," which in 1856 had 1,150 members in 442 establishments, of which 12 were in Belgium, 29 in Algeria, a few in Holland, and the others in France. 3. The "Congregation of Poor School Sisters of Bavaria," founded in 1834 by Sebastian Job and Michael Wittmann, with 109 establishments in Germany and 18 in America. 4. The "Congregation of St. Sauveur le Vicomte," in the diocese of Coutances, with 83 establishments and 460 members. 5. The "Congregation of Nantes," with 63 establishments and 460 members. 6. The "Congregation of Menzingen" (in Switzerland), with 36 houses and 80 sisters. 7. "Ladies of the Sacred Heart" (in 8 congregations, the oldest of which was founded in 1800 by Mlle. Barat), with more than 200 establishments, of which 19 are in North America. 8. "Sisters of St. Joseph" (in several congregations), with about 600 establishments and more than 5,000 members. In the United States there are about 30 different associations of women conducting schools, some of which originated here; as the "Sisters of Loretto," founded in Kentucky in 1812 by the Rev. C. Nerinckx, who have also houses in the dioceses of St. Louis, Little Rock, Kansas, and New Mexico; the "Sisters of Charity of Nazareth," founded in 1812 by the coadjutor bishop of Bardstown, who conduct schools in the dioceses of Louisville, Covington, and Nashville, &c.

**SCHOOLCRAFT**, a co. in the upper peninsula of Michigan, bordering on Lake Superior, and drained by the Whitefish and Manistee rivers; area, 2,600 sq. m.; pop. in 1860, 78. The surface is hilly and covered with dense forests. The "Pictured Rocks," a perpendicular wall of 200 to 300 feet in height, curiously stratified, and extending many miles along the S. shore of Lake Superior, are in this county.

**SCHOOLCRAFT**, HENRY ROWE, LL.D., an American author, born in Watervliet (now Guilderland), Albany co., N. Y., March 28, 1793. His first American ancestor settled in Albany co. in the reign of George II., and taught school, whence his name of Calcraft was popularly changed to Schoolcraft. He entered Union college in his 15th year, studied chemistry and mineralogy under Prof. F. Hall of Middlebury college, Vt., and taught himself Hebrew, German, French, geology, &c. His father being the superintendent of a glass house, he studied the art of glass making, and in 1816 commenced at Utica the publication of a work on "Vitrology," which was not completed. In 1817-'18

he made a journey to the West, and after his return visited Washington with a very complete mineralogical and geological collection, and published "A View of the Lead Mines of Missouri," &c. (8vo., New York, 1819), and a narrative, since enlarged under the title of "Scenes and Adventures in the Semi-Alpine Region of the Ozark Mountains of Missouri and Arkansas" (8vo., Philadelphia, 1853). In 1820 he was appointed geologist to an exploring expedition under Gen. Cass to the Lake Superior copper region and the upper Mississippi, of which he published a narrative in 1821; and in the latter year, being appointed secretary to a commission to treat with the Indians at Chicago, he travelled through Illinois and along the Wabash and Miami rivers, and embodied the results in "Travels in the Central Portions of the Mississippi Valley," &c. (8vo., New York, 1825). Receiving in 1822 the appointment of Indian agent on the N. W. frontier, he established himself at Sault Ste. Marie near Lake Superior, and afterward at Michilimackinac on Lake Huron, married in 1823 Miss Johnston, who was the granddaughter of an Indian chief, but had been educated in Europe, and has since devoted his attention chiefly to Indian ethnology and history. In 1847 he was married again to Miss Mary Howard of South Carolina. From 1828 to 1832 he was a member of the territorial legislature of Michigan, in the former year founded the Michigan historical society, and in 1831 the Algic society at Detroit, two of his lectures before which, on the grammatical construction of the Indian languages, were translated by Duponceau and presented to the French institute, which awarded him a gold medal. During this time he also published several poems, lectures, and reports on his favorite topics, including "The Rise of the West, or a Prospect of the Mississippi Valley, a Poem," "Geehale, an Indian Lament," "Indian Melodies," "The Man of Bronze, or Portraits of Indian Character," and "Iosco, or the Vale of Norma," beside a grammar of the Algonquin language. At the head of a second government expedition in 1832, he was the first to discover the source of the Mississippi, and published a "Narrative of an Expedition to Itasca Lake, the actual Source of the Mississippi River" (8vo., New York, 1834). In 1836, being commissioned to treat with the tribes on the upper lakes, he procured from them the cession of 16,000,000 acres of land to the United States. He was then appointed acting superintendent of Indian affairs, and in 1839 chief disbursing agent, for the northern department. In 1841 he removed to New York, and issued proposals for an "Indian Cyclopædia," which was abandoned for want of encouragement. In 1842 he visited Europe, and on his return made a tour in western Virginia, Ohio, and Canada, communicating his archaeological investigations there to the royal antiquarian society of Denmark, of which he is an honorary member. Under appointment from the state

legislature in 1845, he made a census and collected statistics of the Six Nations of New York, publishing the results in "Notes on the Iroquois, or Contributions to American History, Antiquities, and General Ethnology" (8vo., Albany, 1848). On March 3, 1847, congress, in consequence of his efforts, passed a resolution under which, by direction of the secretary of war, Mr. Schoolcraft engaged in the preparation of an extensive work on the Indians, entitled "Historical and Statistical Information respecting the History, Condition, and Prospects of the Indian Tribes of the United States," of which 6 vols. 4to. have appeared, with 336 plates by Capt. (now Major) Eastman and others (Philadelphia, 1851-'7). This work, though comprising several contributions from government officers and others, is mostly from the pen of Mr. Schoolcraft himself. Beside the publications already mentioned, he is the author of "Algic Researches, comprising Inquiries respecting the Mental Characteristics of the North American Indians" (2 vols. 12mo., New York, 1839); "Talladega, a Tale of the Creek War;" "Oneota, or the Red Race of America" (8vo., New York, 1844; republished with the title of "The Indian in his Wigwam, or Characteristics of the Red Race," 1848); "Personal Memoirs of a Residence of Thirty Years with the Indian Tribes on the American Frontiers" (8vo., Philadelphia, 1853); and "The Myth of Hiawatha and other Oral Legends, Mythologic and Allegoric, of the North American Indians," a revised edition of the "Algic Researches" (8vo., Philadelphia, 1856). His two works on the upper Mississippi have been combined under the title of "Narrative of an Exploratory Expedition to the Sources of the Mississippi River in 1820, resumed and completed by the Discovery of its Origin in Itasca Lake in 1832" (8vo., Philadelphia, 1854). Mr. Schoolcraft has resided in Washington, D. C., since 1847.

**SCHOOLEY'S MOUNTAIN**, a village and watering place in Morris co., N. J., 45 m. N. from Trenton. The mountain has an elevation of 1,100 feet above the level of the sea, and near its summit is a spring discharging 25 gallons of water an hour. It contains carbonated oxide of iron, soda, lime, and magnesia. There are several hotels.

**SCHOOLS.** See COLLEGE, COMMON SCHOOLS, EDUCATION, INDUSTRIAL SCHOOLS, MILITARY SCHOOLS, NORMAL SCHOOLS, and UNIVERSITY.

**SCHOOLS, REFORMATORY.** The Sunday schools founded by Raikes in Gloucester and elsewhere in England, about the year 1781, were primarily intended for vagrant and vicious children only, and were the first distinctly reformatory schools in Europe. The London "philanthropic society for the prevention of crime by the reformation of juvenile offenders, and the industrial education of the destitute offspring of convicted felons," was founded by Arthur Young in 1788, and incorporated in 1806. Its original plan contemplated the grouping of the children in families, under suitable instruc-

tors, each family having a different trade, and the head of each house and his wife to stand *in loco parentum* to the children. This plan was abandoned for the sake of greater economy a few years later, and the children were congregated in one large building, in which the different trades were carried on, and the boys eventually apprenticed to a master in the trade they had learned. For more than 30 years this continued to be the only institution of its kind in the world. In 1818 a "society for the prevention of pauperism and crime" was formed in New York city, and the late John Griscom, Isaac Collins, the late Joseph Curtis, and James W. Gerard were among its active members; mainly through the efforts of these gentlemen, the "society for the reformation of juvenile delinquents" was formed in 1823, and chartered in 1824, and a house of refuge for juvenile offenders opened under its charge, in Jan. 1825. A similar institution was organized in Boston in 1826, and another in Philadelphia in 1828. There are now 19 or 14 of these houses of refuge, or, as some of them are called, state reform schools, in the United States. They are intended mainly for children who have been convicted, or are liable to conviction, for some crime, and are for the most part semi-prisons, so far as high walls, separate cell-like dormitories, task work, and contract labor can make them such; yet the school instruction, the moral culture, the system of grades and promotion for good conduct, and the subsequent indenturing of the children in respectable families or on shipboard, exert a powerful influence for their reformation.—In Europe, efforts were made as early as 1833 to render the system less prison-like in its character. The influence of the family relation was substituted for that of the warden or superintendent; the children were aggregated in groups of from 12 to 50, placed under "house fathers" and "elder brothers" carefully trained for the work, and all the social influences of a well regulated family brought to bear upon their moral nature. There were no tasks, and no contracting of their labor; they were taught no trades, except printing, engraving, bookbinding, &c.; most of them were employed in horticulture and spade husbandry; and the utmost care was taken to develop religious principle. This system originated with Dr. John H. Wichern, whose *Rauhe Haus* at Horn near Hamburg, founded in 1833, has been the parent of a great number of similar institutions. In 1839 M. M. Demetz and Bretignières de Courteilles commenced at Mettrai near Tours, in France, a reformatory colony on still another principle. Their pupils or *colons* now number about 800, mostly young delinquents, conditionally acquitted under the French code, as having acted "without discernment," and committed to Mettrai, usually for the term of their minority. They are grouped in companies of about 50, each occupying a separate house, and the family principle and the *esprit du corps* of a mili-

tary organization are brought into play for their reformation. A considerable number of institutions similarly organized are in existence in France and elsewhere on the continent of Europe, but no other has been so successful as Mettrai. In 1846 the refuge of the London philanthropic society was entirely reorganized, under the Rev. Sydney Turner, and a farm of 140 acres was taken at Red Hill, near Reigate, Surrey. In 1860 it had 270 boys, grouped in families of 30. They are not sent as convicts, but enter voluntarily, though most of them have been convicts. Many of them emigrate after 2 or 3 years to the United States, Canada, or Australia. Of these, only about 11 per cent. relapse into crime, while of those who find employment at home 23 per cent. are reported as relapsing.—At Ruysselede, in Belgium, and the adjacent village of Beernem, are reformatories of still another class, the former for boys and the latter for girls, receiving vagrants and morally endangered children, as well as criminals. They are not grouped in families, but divided into sections of 100 each, under an overseer and assistants. The arrangement and discipline are in the main military, but great pains are taken to win the affections of the pupils. Trades are taught in addition to farm labor, but only very ordinary skill in and knowledge of them is expected or required. The girls are taught the ordinary duties of the farm, housekeeping, and plain needlework. These schools are, we believe, the only ones of their kind in Europe.—In the United States, the rapid increase of vagrant and viciously inclined children, mainly from immigration of a foreign pauper class, induced the conviction that institutions were needed for the training of a younger and less criminal class than those sent to the houses of refuge. The result was the organization of the New York juvenile asylum, and a class of kindred institutions, some of them dividing their pupils into groups or families of 30, 40, or 50; others retaining them all under one roof, but in separate classes. The peculiarities of these asylums are, that the children are younger than in the houses of refuge, viz., between 7 and 14; that they have not been convicted of any crime, though sometimes arrested for petty pilfering, but are committed on a magistrate's warrant, in many instances at their own request; that the asylum is clothed by the state with the power of a parent or guardian over them; that their labor is not contracted for; that they are carefully instructed, and usually at the end of 6 or 12 months returned to their parents or guardians, on their binding themselves to take good care of them, or indentured to farmers or others remote from the city or state where they have formerly resided. These institutions do not rely upon high walls or guards to retain their pupils, and they sleep in large common dormitories. In those institutions in which the family system is preferred, the general arrangement is similar to that at Horn or Mettrai,

though with less of the military element than in the latter. One of them, that at Lancaster, Ohio, has an immense farm, and is attempting a dairy and fruit culture. Another, intended for vagrant and viciously inclined girls, at Lancaster, Mass., unites with the usual female household duties the culture of flowers, and a thorough moral and good intellectual training. —In some of our large cities there are also institutions wholly voluntary, for the care of children who are not yet addicted to vice, but exposed to great danger, such as homes for the friendless; the first, that in New York, was founded in 1834. Houses of industry, missions, and "children's aid societies" (the first organized in New York in 1853), were also established, which gather up children from the streets, and clothe and send them to western homes. In England, private reformatories in large numbers have sprung up, many of them licensed by the government, subject to inspection by government officers, and receiving for each pupil sent them by the magistrates 5s. per week. They are generally small, few having over 30 or 40 inmates, and most of them substantially on the family system. In this country there are few or none of this kind except voluntary ones, which, receiving no children on a magistrate's warrant, are not subject to official inspection. In Prussia and Würtemberg the reformatories are very numerous, but small, and, like the English private reformatories, conducted on the family plan, and subject to a rigid governmental inspection. There are in Germany also a considerable number of private institutions for vagrant and homeless children, where agriculture or horticulture and various trades are taught, and where the children, sometimes numbering 200 or 300, form one great family, under the paternal care of the founder. Such is the school of Pastor Gustav Werner at Reutlingen, and the reformatory department of Pastor Fliedner's establishment at Kaiserswerth. In England in 1860 there were 57 licensed reformatories, beside nearly as many unlicensed; the licensed reformatories had accommodations for 4,500 children, but were not quite full. In Scotland there were 17, with accommodations for 1,840 children, beside a considerable number of refugees and numerous ragged schools, all reformatory in character, and some of them receiving children mainly on a magistrate's warrant; there were also many unlicensed reformatories and industrial schools for vagrant children. The whole number of licensed and unlicensed reformatories in Great Britain in Oct. 1859, was 155, and they had under their care about 11,000 children. Ireland had only 6 licensed, but numerous unlicensed reformatories. The report of the inspector of British licensed reformatories for the year ending Jan. 1, 1860, states the number of children in the English reformatories to be 3,276, of whom 2,636 were boys and 640 girls. Not quite 13 per cent. of all discharged had been reconvicted of crime, and 52 per cent.

were known to be maintaining a good character. The effect of these institutions in diminishing juvenile crime has been very satisfactory; the number of juvenile delinquents under 16 years of age arrested having decreased 36 per cent. in 4 years, while the number of older persons arrested had remained stationary. In the United States, there were known to be 43 reformatories in 1860, and the present number does not probably exceed 50. Their capacity of accommodation cannot greatly exceed 8,000. The percentage thoroughly reformed cannot be definitely ascertained, as very many of the children are not heard from after discharge, or at least after the first year. Taking, however, the results of those institutions which have been most careful in maintaining a correspondence with their children after their discharge, it is safe to say that not more than 15 per cent. are known to relapse into crime and come again under the cognizance of the law; and in that class of reformatories where the children are not committed for crime, the percentage of those who become vicious after their discharge will not exceed 10 per cent. In the city of New York the number of petty thieves under 10 years of age had, in the 9 years ending with 1860, diminished 80 per cent., and of vagrant children under that age 50 per cent. Of criminals committed to the first district city prison of New York city, in 1850, there were under 20 years of age 5,508, with a total population of 515,500; in 1860 there were only 3,880, with a population of 814,287; a reduction, if the increase of population is taken into account, of nearly 56 per cent., and an actual diminution of about 30 per cent.; while the number of criminals above that age in 1850 was 16,284, and in 1860 25,072, or very nearly the same percentage of the population (3.16) which existed in 1850.—The European reformatories have one great difficulty to contend with, which is not felt here, that of finding suitable places for the children. The army receives some, and the navy in France a considerable number; but the remainder, if sent back among their old associations, soon relapse into vice. To obviate this difficulty in part, patronage societies have been formed in France, composed of two classes, patrons and subscribers; the latter contribute to the necessary expenses, and the former assume the supervision of one or more of these children after their discharge from the reformatory. These societies aid the *libérés*, as they are called, to emigrate where they desire to do so, and a patron in a foreign country becomes their friend, seeks their welfare, and corresponds at stated intervals with the society in regard to their conduct and condition. If they remain in France, wherever they settle, they are furnished with a letter to a patron in that place, who is their friend and adviser in difficulty, and watches over them, reporting their conduct and condition quarterly to the society.—See "The Irish Quarter-



ly Review, Quarterly Record of Reformatory Schools, &c." (Dublin, 1854-'61); "Juvenile Delinquents, their Condition and Treatment," by Mary Carpenter (12mo., London, 1853); "Papers on Preventive and Reformatory Institutions and Agencies," edited by Henry Barnard (Hartford, 1857); "Proceedings of the First and Second Conventions of Managers and Superintendents of Houses of Refuge and Schools of Reform in the United States" (2 vols. 12mo., New York, 1858-'60); "Reports of the Inspector-General of Reformatories in Great Britain," the Rev. Sydney Turner (London, 1857-'61).

**SCHOONER**, a vessel usually having two masts, with fore-and-aft sails, but sometimes carrying a square fore-sail, square foretopsail, and top-gallant sail.

**SCHOPENHAUER**, ARTHUR, a German philosopher, born in Dantzig, Feb. 22, 1788, died in Frankfort-on-the-Main, Sept. 21, 1860. He studied successively at Göttingen and Berlin, and in 1814 spent the winter at Weimar with Goethe, who initiated him into his own studies on colors, on which subject Schopenhauer in 1816 published an essay, *Ueber Sehen und Farben*. From 1814 to 1819 he lived at Dresden, and brought his philosophical views into a system, an exhibition of which was given in 1819 in his chief work, *Die Welt als Wille und Vorstellung*. In 1820 he established himself as lecturer at the university of Berlin, but resigned after 6 months, and returned to private life. In 1831 he settled at Frankfort-on-the-Main, where, in the enjoyment of a large private fortune, he spent the remainder of his life. On account of his pessimist view of the world, he was called the "misanthropic sage." Beside the works already mentioned, he published *Ueber den Willen in der Natur* (Frankfort, 1836); *Die Freiheit des menschlichen Willens*, which received a prize in 1839 from the Norwegian academy of sciences; and *Das Fundament der Moral* (Frankfort, 1841). The two last mentioned works were published in a thoroughly revised edition in 1860, under the title, *Die beiden Grundprobleme der Ethik*. His last and most popular work, a collection of philosophical essays, appeared in 1851 under the title, *Parerga und Paralipomena*.—According to the philosophical system of Schopenhauer, the only thing truly real, original, and metaphysical is will. The world of objects consists merely of appearances, and lies entirely in our representation. Will is the "thing in itself" of the Kantian philosophy, the substratum of all appearances, and of nature itself. It is totally different from and wholly independent of cognition, can exist and manifest itself without it, and actually does so in all nature from animal beings downward. Not only the voluntary actions of animated beings, but also the organic frame of their bodies, its form and quality, the vegetation of plants, and, in the inorganic empire of nature, crystallization and every other original power

which manifests itself in physical and chemical phenomena, as well as gravity, are something outside of appearance and identical with what we find in ourselves as will. An intuitive recognition of the identity of will in all the phenomena separated by individuation is the source of justice, benevolence, and love; while from a non-recognition of its identity spring egotism and malice. It also results from the original identity of will in all its phenomena, that the reward of the good and the punishment of the bad are not reserved to a future heaven and a future hell, but are ever present. The philosophy of Schopenhauer was radically at variance with the philosophical systems of Fichte, Schelling, Hegel, Herbart, and other contemporaries, and their authors were treated by Schopenhauer with unbounded contempt. While studying at Berlin under Fichte, he openly avowed his disgust with his teacher's philosophy, and Hegel was called by him a scribbler of nonsense. This contempt was fully reciprocated on the other side, and at the universities Schopenhauer was so effectually ignored as hardly to become known to the majority of the students of philosophy. And yet Goethe in the *Tag und Jahreshefte* of 1819, and Jean Paul in his *Kleine Nachschule zur ästhetischen Vorschule*, had spoken highly of his talents and of the value of his works. His disciple Frauenstädt, though not sharing all his views, and in particular rejecting the idea that the present world is radically evil, has been indefatigable in urging, in a number of the German periodicals and in his *Briefe über die Schopenhauer'sche Philosophie* (Leipsic, 1854), the claims of Schopenhauer to be ranked among the great philosophers.—**JOHANNA**, a German authoress, mother of the preceding, born in Dantzig in July, 1770, died in Jena, April 18, 1838. She was the daughter of H. Frosina, and the wife of a Dantzig banker, after whose death (1806) she devoted herself to literary pursuits. She wrote several attractive books, but is chiefly distinguished as a novelist, her first essay in this character being with a volume of *Novellen, fremd und eigen* (Rudolstadt, 1816). In 1819 she published her best novel, *Gabriele*, which was followed by *Die Tante* (2 vols., Leipsic, 1823), *Sidonie* (1828), and others. Her work on *Johann von Eyck und seine Nachfolger* appeared at Frankfort in 1822. Her "Works" were published at Leipsic in 1830-'31, in 24 vols.—Her daughter, **ADELE SCHOPENHAUER** (died 1849), published *Haus-, Wald- und Feldmärchen* (2 vols., Leipsic, 1844), and a novel entitled *Anna* (2 vols., Leipsic, 1845).

**SCHOUW**, JOACHIM FREDERIK, a Danish botanist, born in Copenhagen, Feb. 7, 1789, died April 23, 1852. He first studied law, and afterward natural philosophy, and especially botany, at the university of Copenhagen. In 1812 he made a botanical tour in Norway, in 1813 became a clerk in the Danish chancery, and in 1816 received the degree of Ph.D. for his es-

say *De Sedibus Plantarum Originariis*. He afterward travelled through Germany, France, and Italy, and in 1821 was appointed professor of botany and in 1841 keeper of the botanic gardens at Copenhagen. He studied particularly the geographical distribution and relations of plants, his views upon which are generally regarded as of the highest authority. He was an active politician of the liberal school, was in 1835 elected by the university to the Danish assembly, of which he was president for 3 years, and in 1844 was spokesman for the deputation which petitioned the king for the grant of equal rights to Schleswig. The most important of his works are: "Elements of a Universal Geography of Plants" (in Danish, Copenhagen, 1822; German, Berlin, 1823); *Specimen Geographiæ Physicæ Comparativæ* (1828); "Physico-Geographical Description of Europe" (in Danish and German, 1832-'3); *Tableau du climat et de la végétation d'Italie* (with an atlas, 1839); and "Delineations of Nature" (in Danish, 2 vols., 1839-'45; German, Leipsic, 1851). His "Earth, Plants, and Man" has been translated into English by Prof. Henfrey.

SCHREVELIUS, CORNELIUS, a Dutch scholar, born in Haarlem about 1614, died in 1664 or 1667. He succeeded his father as rector of the school in Leyden in 1662, after which time he devoted himself entirely to classical pursuits. He published *variorum* editions of Juvenal, Persius, Terence, Virgil, Horace, Cicero, and other Latin authors, and a *Lexicon Manuale Græco-Latinum*, which has been more extensively used than almost any other work of the kind. All his works are distinguished more for their elegance than their accuracy.

SCHRÖCKH, JOHANN MATTHIAS, a German church historian, born in Vienna, July 26, 1733, died in Wittenberg, Aug. 2, 1808. He studied theology at Göttingen under Mosheim, became in 1754 academic *Docent* at Leipsic, where he was also librarian, and was appointed professor of philosophy at Wittenberg in 1762, of poetry in 1767, and of history in 1775. His most important works are the *Christliche Kirchengeschichte* (35 vols., Leipsic, 1768-1803; 2d ed. by Tzschirner, 1772-1825), and the *Kirchengeschichte seit der Reformation* (8 vols., Leipsic, 1804-'9; 2 vols. added by Tzschirner, 1812).

SCHRÖDER, FRIEDRICH LUDWIG, a German actor and dramatist, born in Schwerin, Nov. 3, 1744, died in Hamburg, Sept. 3, 1813. He appeared upon the stage at 3 years of age, and thenceforth for upward of 60 years was connected with the theatre as actor, author, or manager. About the age of 25 he made his debut at Hamburg in tragedy, and was soon regarded as one of the greatest German tragedians. Subsequent to 1771 he assumed the management of the theatre at Hamburg, and produced a number of original comedies, beside translations of several of Shakespeare's plays, which he was the first to introduce upon the German stage. His *Dramatische Werke* were edited by Bülow (4 vols., Berlin, 1831).

SCHRÖDER, SOPHIE BÜRGER, a German actress, born in Paderborn, Feb. 29, 1781. She belonged to a family of actors, and was brought upon the stage in early childhood. Having procured an engagement at Hamburg, she was in 1804 married to F. S. Schröder, and remained in that city until 1813. Subsequently at Vienna she rose to the first rank in her profession, assuming such parts as Phædra, Medea, Lady Macbeth, Merope, and others in the higher walks of tragedy. In 1836 she took leave of the stage. She is the mother of the celebrated actress Mme. Schröder Devrient. (See DEVRIENT.)

SCHRÖDER, ADOLF, a German painter, born in Schwedt, Prussia, June 28, 1805. He studied copper-plate engraving in Berlin 7 years, and in 1829 went to Düsseldorf, where he began the profession of a painter. In 1846 he settled in Frankfort. He is chiefly distinguished for his humorous pieces, which are characterized by lively invention, and a nice elaboration of details. A well known example of this class of his works is the "Wine Tasters," which has been engraved. He has occasionally produced *genre* pictures of a serious character and etchings.

SCHUBART, CHRISTIAN FRIEDRICH DANIEL, a German poet and musician, born in Oertrath in the Swabian county of Limburg, March 26, 1739, died Oct. 10, 1791. He studied theology at Jena, thence went home with his health shattered by dissipation, became a private tutor, and attempted to gain a livelihood in Aix la Chapelle by preaching. In 1758 he became musical director in Ludwigsburg, but on account of his dissolute conduct was thrown into prison, and was subsequently banished. He now led a wandering life, going from Heilbronn, where he taught music, to Heidelberg, then to Mannheim, to Munich, and to Augsburg, where he founded his *Deutsche Chronik* (1774-'7), a journal of politics, literature, and art. Ordered to leave the city by the burgo-master, he transferred his *Chronik* to Ulm, and while there published the false report that the empress Maria Theresa was dead, for which he was imprisoned about 10 years, until his liberty was demanded by Frederic the Great in 1787. In Stuttgart, where he became musical director and director of the theatre, he continued his *Chronik* under the title of *Vaterlands-Chronik*. He wrote *Gedichte aus dem Kerker* (1785), a remarkable poem entitled *Hymnus auf Friedrich den Grossen* (1786), an autobiography, and a large number of musical pieces. His *Gesammelte Schrifte und Schicksale* appeared in 8 vols. (Stuttgart, 1839-'40).

SCHUBERT, FRANZ, a German composer, born in Vienna, Jan. 31, 1797, died there, Nov. 19, 1828. In his childhood he was one of the singing boys of the court chapel, and when his voice changed devoted himself to a course of self-instruction. He tried his hand, often with astonishing success, at every form of composition. His works include operas, symphonies, and almost every other sort of music; but he

is best known by his songs, of which 200 have been printed. He is regarded as one of the finest geniuses among musical composers.

SCHUBERT, GOTTHILF HEINRICH VON, a German mystic, born at Hohenstein, Saxony, April 26, 1780, died near Munich, July 1, 1860. He studied at Weimar, Leipsic, and Jena, and practised medicine at Altenburg, Freiberg, and Dresden (1806). He was director of an educational institution in Nuremberg from 1809 to 1816, tutor to the children of the grand duke of Mecklenburg-Schwerin till 1819, and professor of the natural sciences at Erlangen till 1827, after which time he held the same chair at Munich. A disciple of Schelling, at once a pietist and a savant, he published numerous works embodying mystical interpretations of natural phenomena, and forming a system of objective idealism. Among them are: *Ahnungen einer allgemeinen Geschichte des Lebens* (3 vols., Leipsic, 1806-'20); *Ansichten von der Nachtseite der Naturwissenschaften* (1808; 4th ed., 1840); *Symbolik des Traums* (1814; 8d ed., 1840); *Geschichte der Seele* (1830; 2d ed., 1833), his most important work, treating obscure questions concerning spiritual influences and extraordinary mental operations; and *Altes und Neues aus dem Gebiete der innern Seelenkunde* (5 vols., 1817-'44). He also published manuals of natural history, narratives of travel in France, Italy, and the Levant, several volumes of tales and biographies, and an autobiography (3 vols., 1853-'6).

SCHULTENS, ALBERT, a Dutch orientalist, born in Groningen in 1686, died in Franeker, Jan. 26, 1750. He was educated at Leyden and Utrecht, became preacher at Wassenauer near Leyden in 1711, and in 1713 professor of oriental languages and in 1717 also university preacher at Franeker. He was the first to apply the principles of comparative philology to the Hebrew and kindred Semitic languages. His chief work is the *Institutiones ad Fundamenta Linguae Hebraicae* (Leyden, 1737).—His son JOHN JACOB, born in Franeker in 1716, died Nov. 27, 1778, at Herborn, where he was professor, was a distinguished orientalist; as was also his grandson, HENRY ALBERT, a professor at Leyden, born in Herborn in 1749, died in 1793. The great work of the latter was the *Anthologia Sententiarum Arabicarum* (Leyden, 1772).

SCHULTZ-SCHULTZENSTEIN, KARL HEINRICH, a German physiologist, born at Altruppin, Prussia, July 8, 1798. He was educated at Berlin, where he became in 1825 extraordinary, and in 1833 ordinary professor of physiology. His works are very numerous. Of his writings in which he gives an account of his microscopical investigations in regard to the movement of sap and the internal organization of plants, the most important are: *Die Cyclose des Lebensaftes in den Pflanzen* (Bonn and Breslau, 1841); *Ueber Anaphytose oder Verjüngung der Pflanzen* (Berlin, 1843); *Neues System der Morphologie der Pflanzen* (1847); and *Die Verjüngung im Pflanzenreich* (1851). In the department of animal physiology his most im-

portant works are: *Ueber die Verjüngung des menschlichen Lebens* (Berlin, 1842) and *Die Verjüngung im Thierreich* (1854). He has also written on the history of medicine.

SCHULZE, ERNST CONRAD FRIEDRICH, a German poet, born in Celle, March 22, 1789, died there, June 29, 1817. He went in 1806 to Göttingen to study theology, but, influenced by his friend Bouterwek, paid much attention to æsthetic and classical studies, and at this time wrote his narrative poem, *Psyche* (Leipsic, 1819). This was followed by *Cécilie*, a romantic poem in 20 cantos (2 vols., new ed., Leipsic, 1822), in honor of Cécilie Tyelsen, a lady to whom he had been attached, and who had died. After participating in the war against France in 1814, he wrote *Die bezau-bernte Rose*, translated into English by Carolino von Erespigny (Heidelberg, 1844). Bouterwek edited his collected works in 4 volumes, with a life of the poet; but a new edition of his works with a fuller account of his life appeared at Leipsic in 1855 in 4 volumes.

SCHUMACHER, HEINRICH CHRISTIAN, a Danish astronomer, born in Bramstedt, Holstein, Sept. 3, 1780, died Dec. 23, 1850. He was educated at Kiel, Jena, Copenhagen, and Göttingen, resided from 1807 to 1810 in Altona, and in the last named year became extraordinary professor in the university of Copenhagen. In 1813 he became superintendent of the observatory at Mannheim, and in 1815 ordinary professor of astronomy and superintendent of the observatory at Copenhagen. In 1816 he was employed to measure the territory of Hamburg, and in 1817 to measure the degrees of latitude from Lauenburg to Skagen, and the degrees of longitude from Copenhagen to the W. coast of Jutland. In 1821 he received the direction of the survey and mapping of Holstein and Lauenburg, and from that time lived in Altona. In 1824, in connection with the English board of longitude, he determined the difference of longitude between the observatories of Greenwich and Altona, and in 1830 he made at the castle of Guldenstein the observations in regard to the length of the seconds pendulum which served as the base of the Danish scale of measures. Through the influence of his pupil W. von Struve, director of the observatory of Pultowa, he received a pension from the czar Nicholas. In 1822 Schumacher published accurate accounts of the distances of Venus, Jupiter, Mars, and Saturn from the moon. In 1821 he began his *Astronomische Nachrichten*, a journal which is still continued; and in conjunction with other astronomers, especially Bessel, he undertook at Stuttgart in 1836 the editing of an *Astronomisches Jahrbuch*.—CHRISTIAN ANDREAS, a Danish mathematician and physicist, nephew of the preceding, born in Tjørnelund, Seeland, Sept. 6, 1810. He was educated by his uncle, and entered the Danish service as officer of artillery. Subsequently he studied the natural sciences at various German universities. He has published a course

of lectures on astronomy, and a translation of Humboldt's *Kosmos* (1847), and contributed many valuable scientific articles to the *Mémoires des savants étrangers* of the academy of St. Petersburg, the *Scandinaviske Folke-Kalender* of Copenhagen, and other periodicals. He resides in Copenhagen, and since 1848 has edited the *Nordlyset*, a journal devoted to science and industrial arts.

SCHUMANN, ROBERT, a German musical composer, born in Zwickau, Saxony, Jan. 8, 1810, died July 29, 1856. His first compositions, published while he was a law student at Leipsic, were melodies adapted to some of Byron's light poems. In 1834, in conjunction with Knorr and Wieck, he established the "New Musical Gazette," to which for 12 years he contributed critical papers, in the mean time composing fantasias, symphonies, concertos, an oratorio entitled "Paradise and the Peri," and a number of popular songs. In 1847 he produced an opera, "Genoveva of Brabant," which failed. His mind, which had always been unsettled, became wholly deranged, and on Feb. 27, 1854, he suddenly left his friends and threw himself into the Rhine; he was saved by some boatmen, and placed in an insane asylum near Bonn, where he died.—His wife, CLARA WIECK, born in Leipsic, Sept. 13, 1819, is one of the most celebrated German pianists, and especially excels in rendering the works of Beethoven, Chopin, and her husband.

SCHUYLER. I. A S. W. co. of N. Y., organized in 1854; area, 352 sq. m.; pop. in 1860, 18,840. A portion of Seneca lake, and Cayuta, Little, Mud, and other small lakes are within its borders. The surface is hilly and the soil fertile. The productions in 1855 were 113,571 bushels of wheat, 357,247 of oats, 160,780 of Indian corn, 81,106 of potatoes, 67,528 of buckwheat, 60,507 of barley, 148,229 of apples, 17,996 tons of hay, 798,953 lbs. of butter, and 152,554 of wool. There were 50 churches, 118 schools, 3 newspaper offices, 15 grist mills, and 84 saw mills. The Chemung canal, and the Elmira and Canandaigua and Chemung railroads, pass through the county. Capital, Havana. II. A W. co. of Ill., bordered S. E. by the Illinois river, and S. W. by Crooked creek; area, 420 sq. m.; pop. in 1860, 14,685. The surface is undulating and the soil excellent. The productions in 1850 were 79,930 bushels of wheat, 398,160 of Indian corn, 56,570 of oats, and 186,823 lbs. of butter. There were 12 churches and 1 newspaper office. The central military tract railroad passes through the county. Capital, Rushville. III. A N. E. co. of Mo., bordering on Iowa, bounded W. by Chariton river, and drained by the N. fork of Salt river and the head streams of Fabius river; area, 324 sq. m.; pop. in 1860, 6,697, of whom 39 were slaves. The soil is rich and the surface diversified by woodland and prairie. The productions in 1850 were 7,395 bushels of wheat, 221,780 of Indian corn, 21,996 of oats, and 37,738 lbs. of butter. Capital, Lancaster.

SCHUYLER, PHILIP, an American general, born in Albany, N. Y., Nov. 22, 1783, died there, Nov. 18, 1804. He entered the army in 1755 against the French and Indians, accompanied Sir William Johnson to Fort Edward and Lake George, and was assigned by Lord Howe to the commissariat department. After the peace he became a member of the colonial assembly of New York, and warmly opposed the British government in its attempts to tax the colonies without their consent. He was a delegate to the continental congress in 1775, was appointed by that body a major-general, and charged with the command of the army in New York and the preparations for an expedition against Canada; but being taken sick, the command devolved upon Montgomery. On his recovery he took an active part in the superintendence of Indian affairs, and in perfecting the discipline of the army. After St. Clair's evacuation of Ticonderoga, unreasonable suspicions against Schuyler caused him to be superseded by Gates; but his conduct was afterward fully approved by a court of inquiry. Although solicited by Washington to resume a command, he declined, but continued to render important services to the government in the military operations in New York. He was a member of congress prior to the formation of the constitution, and afterward twice U. S. senator from New York.—See "Life and Times of Philip Schuyler," by Benson J. Lossing (vol. i., 12mo., New York, 1860).

SCHUYLKILL, a river of E. Pennsylvania, rising in the carboniferous highlands of Schuylkill co. and flowing S. E. into the Delaware river 5 m. below Philadelphia; length, 120 m. It is navigable for sloops to Philadelphia, and has slack water navigation to Port Carbon, 8 m. above Pottsville.

SCHUYLKILL, an E. co. of Penn., drained by the Schuylkill river, bounded S. E. by Kitatinny or Blue mountain, and traversed by the Broad, Sharp, and Mahanoy mountains; area, 750 sq. m.; pop. in 1860, 90,173. The surface is very mountainous, and the soil except along the streams generally poor. Anthracite coal forms the great source of wealth, and extensive beds of iron exist. The productions in 1850 were 64,928 bushels of wheat, 165,556 of Indian corn, 186,380 of potatoes, 324,143 lbs. of butter, and 16,644 tons of hay. There were 104 collieries, 37 grist mills, 103 saw mills, 4 woollen factories, 5 powder mills, 14 tanneries, 10 newspaper offices, and 85 churches. In 1860 there were 12,207 pupils attending public schools. The Philadelphia, Reading, and Pottsville, the Catawissa, and several short railroads enter this county. Capital, Pottsville.

SCHWAB, GUSTAV, a German author, born in Stuttgart, June 19, 1792, died Nov. 4, 1850. He studied theology at Tübingen, and was appointed professor of ancient literature at the gymnasium of Stuttgart in 1817. As a poet he is best known by his national songs and ballads, and he has edited a collection of specimens

of German prose and verse (2 vols., 1842). Of his prose writings, his "Life of Schiller" (Stuttgart, 1816) is the most esteemed.

**SCHWANTHALER**, **LUDWIG MICHAEL**, a German sculptor, born in Munich, Aug. 26, 1802, died Nov. 15, 1848. He was educated under his father, who was also a sculptor, and after spending a year in Rome pursuing his profession, he returned to Munich, and there remained till his death, which was hastened by his unceasing labor. His works are exceedingly numerous. Among the more prominent of them are the rilievo frieze for the Barbarossa hall at Munich, more than 200 feet long; the model for the images of the 12 ancestors of the house of Wittelsbach, in the throne room of the new palace of the king of Bavaria; the 15 colossal statues for the pediment of the Walhalla at Ratisbon; the model of the 15 statues of the *Hermann-Schlacht* or "Battle of Arminius" in the northern pediment of the Walhalla; and the model of the colossal statue of Bavaria, 54 feet high, which was begun in 1844, but which the sculptor did not live to see finished. He also designed numerous statues of the great men of Germany, and important public works at Vienna, Carlsruhe, Salzburg, Frankfort, and other cities.

**SCHWARTZ**, or **SCHWARZ**, **BERTHOLD**, a German monk and alchemist of the 14th century, to whom is traditionally attributed the invention of gunpowder. He was a native of Freiburg in Breisgau, and his true name was Konstantin Ancklitzen; Berthold was his cloistral name, and Schwartz (black) was a sobriquet bestowed in consequence of his occult pursuits. He is differently represented as a Franciscan of Mentz and of Nuremberg, and as making his discovery at Cologne and at Goslar. Whether he made an original discovery of the composition of gunpowder, or merely devised its application to war and the chase, is equally uncertain; but the latter is more probably the case, as gunpowder is supposed to have been known before the date to which he is assigned. A monument to his memory was erected at Freiburg in 1853.

**SCHWARTZENBERG**, **KARL PHILIPP**, prince, and duke of Kruman, an Austrian field marshal, born in Vienna, April 15, 1771, died in Leipsic, Oct. 15, 1820. He distinguished himself under Lacy in the war against the Turks, and also in the war against France, and in the campaign of 1793 commanded part of the advance guard of the prince of Coburg, and was made colonel. In 1794, at the battle of Cateau-Cambrésis, he cut his way at the head of his regiment and of 12 British squadrons through a line of 27,000 men. After the victory of Würzburg he was made major-general, and in 1799 lieutenant field marshal. In 1800 he succeeded in saving his corps in the battle of Hohenlinden, and in 1805 commanded under Gen. Mack the right wing of the Austrian army at Ulm. At the wish of the czar Alexander he was made Austrian ambassador at St. Peters-

burg in 1808. He was present in the following year at the battle of Wagram, commanding the rear guard on the retreat, and after the peace of Vienna was sent to France as Austrian ambassador. There he conducted the negotiations in regard to the marriage of Napoleon with the archduchess Maria Louisa, and by the desire of the French emperor commanded the Austrian contingent in the campaign of 1812 against Russia. French historians charge him with acting with reluctance against the Russian troops, probably obeying the secret instructions of his government. At the request of Napoleon, the emperor Francis created him a marshal. In 1813 he was in Paris attempting to negotiate a peace between France and Russia. After his return he received the supreme command of the allied troops of Russia, Austria, and Prussia, gained the victory of Leipsic, and marched to Paris. On the return of Napoleon from Elba he received the command of the allied army on the upper Rhine, and a second time entered France after the battle of Waterloo. At the end of the campaign of 1815 he was made president of the imperial military council, and was presented with several estates in Hungary.—**FELIX LUDWIG JOHANN FRIEDRICH**, prince of, an Austrian statesman, nephew of the preceding, born at the estate of Kruman in Bohemia, Oct. 2, 1800, died in Vienna, April 5, 1852. He entered a regiment of cuirassiers in 1818, became captain, and in 1824 went to St. Petersburg as attaché to the Austrian embassy. Two years later he was sent with despatches to London, joined the extraordinary mission to Brazil under Baron Neumann, and after his return to Europe was employed in a diplomatic character at various courts. While in Naples his residence was insulted during an uprising of the people, March 26, 1848; and as sufficient satisfaction was not given, he returned to Vienna, and as major-general, which rank he had obtained in 1842, commanded a brigade under Nugent in upper Italy, distinguished himself in the battles of Curtatone and Goito, and was made lieutenant field marshal before the battle of Custoza. He was recalled to Austria by the troubles in the capital, and after the suppression of the revolution in Vienna was placed, in Oct. 1848, at the head of the administration. During his term of office the aid of Russia was obtained for the suppression of the Hungarian revolution, and a daring policy pursued in Germany. (See **AUSTRIA**.) A stroke of apoplexy terminated his no less dissolute than active life.

**SCHWARZ**, **CHRISTIAN FRIEDRICH**, a German missionary, born at Sonnenburg in Brandenburg, Oct. 8, 1726, died in Tanjore, Hindostan, Feb. 13, 1798. He studied Tamul to aid Schultz in translating the Bible into that language, and, having resolved to become a missionary, was ordained according to the forms of the Danish church at Copenhagen in 1749, visited England to obtain the patronage of the society for the propagation of the gospel,

and in 1750 sailed for Tranquebar. He removed thence to Trichinopoly, and finally to Tanjore, where he spent the last 20 years of his life. The rajah of Tanjore committed to him the education of his son and successor; and Hyder Ali received him as an ambassador after refusing all others. When Hyder Ali invaded the Carnatic, and the inhabitants and garrison of Tanjore were reduced almost to starvation, Schwarzburg induced the native farmers to bring in their cattle, pledging his word for their payment. After his death the rajah of Tanjore and the East India company each erected a monument to his memory.

**SCHWARZBURG-RUDOLSTADT**, a German principality, bounded by the Saxon duchies, Prussian Saxony, and the principalities of Reuss and Schwarzburg-Sondershausen; area, 371 sq. m.; pop. in 1858, 70,030. It is divided into the upper lordship of Rudolstadt, and the lower of Frankenhäusen. The chief towns are Rudolstadt, the capital, Königsee, Blankenburg, Ilm, and Frankenhäusen. The surface of the upper lordship is mountainous, and that of the lower rises into hills of moderate height. The principal rivers are the Saale, Schwarz, and Ilm. The country is rich in lead, iron, salt, alum, cobalt, marble, gypsum, and porcelain clay. The soil is not naturally fertile, but agriculture is conducted with great skill. The forests of the mountainous parts are extensive. The vine is cultivated in some places, and large numbers of horses, horned cattle, sheep, and swine are reared. The manufactures are of considerable importance, and include linen and woollen goods, iron, paper, oils and medicinal substances, brewing, distilling, preparing pitch and tar, and lampblack. The inhabitants are nearly all Lutherans. The government is a limited monarchy, the executive power being in the hands of the prince, and the legislative in a diet of 16 members. The public revenue in 1860 was 787,310 florins, and the expenditures 779,970. As a member of the Germanic confederation, Schwarzburg-Rudolstadt has a vote in the *plenum*, and shares the 15th vote in the executive committee with Schwarzburg-Sondershausen, Oldenburg, and the Anhalt duchies. It furnishes a contingent of 899 men to the federal army. The counts of Schwarzburg, as they were formerly called, were originally vassals of Saxony, but purchased their independence in 1699. The reigning sovereign is Prince (Frederic) Gunther (born Nov. 6, 1798), who succeeded his father in 1807.

**SCHWARZBURG-SONDERSHAUSEN**, a German principality, bounded by Prussian Saxony, the Saxon duchies, and Schwarzburg-Rudolstadt; area, 328 sq. m.; pop. in 1858, 62,974. It is divided into the upper lordship of Arnstadt and the lower of Sondershausen. The principal towns are Sondershausen, the capital, Clingen, Schernberg, Greussen, Ebeleben, Keula, Arnstadt, and Gehren. The surface of the S. part of the country is mountainous, and that of the N. undulating. The chief streams are the

Gera, Ilm, Helbe, and Wipper, all of which are tributaries either directly or indirectly of the Saale. The soil is more fertile than that of Schwarzburg-Rudolstadt. Flax is extensively cultivated, and large numbers of live stock are reared. The forests furnish timber of excellent quality; and the minerals include iron, copper, alum schist, and porcelain clay. The contingent furnished by Schwarzburg to the army of the German confederation is 744 men. The revenue in 1860 was 599,938 thalers, and the expenditures 593,801. The constitution resembles that of Schwarzburg-Rudolstadt, and it is governed by a branch of the same family. The reigning sovereign is Prince Gunther (Frederic Charles, born Sept. 24, 1801), who took the reins of government after the abdication of his father in 1835.

**SCHWARZWALD**. See BLACK FOREST.

**SCHWEGLER**, ALBERT, a German theologian and historian, born at Michelbach, Württemberg, Feb. 10, 1819, died Jan. 5, 1857. He was the son of a Protestant clergyman, studied at Tübingen, adopted the theological views of Dr. Baunr, and became one of the chief representatives of the Tübingen school. (See GERMAN THEOLOGY.) In 1841 he published his first theological work on "Montanism," which, together with several articles published in the *Theologische Jahrbücher* of Zeller, drew upon him the disfavor of the ecclesiastical and state authorities, and induced him to leave the ranks of the clergy. In 1843 he established a literary and political periodical, entitled *Jahrbücher der Gegenwart*, which was continued until 1848. He also began in 1843 to lecture, as *Privatdozent*, at the university of Tübingen on philosophy and classical philology, and in 1848 was made extraordinary professor. He published *Das nachapostolische Zeitalter* (2 vols., Tübingen, 1846); *Geschichte der Philosophie* (Stuttgart, 1848; translated into English by Seelye, New York, 1856); new editions of the Clementine Homilies (1847), the "Metaphysics" of Aristotle, with German translations and commentary (4 vols., Tübingen, 1847-'8), and of the "Ecclesiastical History" of Eusebius (2 vols., 1852); and a valuable *Römische Geschichte* (3 vols., Stuttgart, 1853-'60).

**SCHWEIDNITZ**, a fortified town of Prussia, province of Silesia, on a hill near the left bank of the Weistritz, and on the Breslau and Reichenbach railroad, 29 m. S. W. from the former town; pop. 14,488. It has barracks, manufactories of woollen and linen goods, paper, and silk; and several large breweries and distilleries. In the 7 years' war the town was twice taken by the Austrians (1757 and 1761), and twice recovered by the Prussians (1758 and 1762). The French captured it in 1807, and destroyed the outer defences.

**SCHWENKFIELD**, CASPAR VON, the founder of a religious sect, born in Ossig, Silesia, in 1490, died in Ulm about 1561. He was by descent a Silesian knight, councillor to the duke of Liegnitz, and an eager advocate of the refor-

mation. He differed however from Luther and the other reformers in several points, especially in the deification of the body of Christ, which he would not allow to be called a creature or a created substance. He was persecuted on account of his peculiar views by both Roman Catholics and Protestants, and from 1528, when he was expelled from Silesia, until his death, was driven from one town to another. His moral character was never impugned by any of his opponents, and his numerous writings (some 90 treatises) are therefore regarded as one of the most valuable sources of the history of the reformation. His adherents, called Schwenkfelders or Schwenkfeldians, lived mostly in Silesia, and were often exposed to persecution. In 1734 a considerable number emigrated to Pennsylvania, where they settled principally in Montgomery, Berks, Bucks, and Lehigh counties. At present they number about 800 families and 800 members, and have 5 churches and school houses.

SCHWERIN, KURT CHRISTOPH, count, a German field marshal, born in Swedish Pomerania in 1684, killed at the battle of Prague, May 3, 1757. At the age of 16 he was commissioned as ensign in the Dutch army, fought under Marlborough and Eugene, and after an active military career entered the service of Frederic William I. of Prussia in 1720, with the rank of major-general. Upon the accession of Frederic the Great he was appointed a field marshal with the title of count, and in 1741 gained the decisive battle of Mollwitz, by which the Prussians secured possession of Silesia. In 1744 he took Prague, but in the 7 years' war fell in the great battle before that city while he was leading a charge of Prussian grenadiers.

SCHWYTZ, a canton of Switzerland, bounded by the cantons of Zürich, St. Gall, Glarus, Uri, Unterwalden, Lucerne, and Zug; area, 354 sq. m.; pop. in 1850, 44,168. The surface is traversed by chains of mountains with offsets extending in every direction. The Rossberg, which is partly in this canton and partly in Zug, is 5,195 feet above the sea; in 1806 a portion of it fell with most destructive effect. The other points of greatest elevation are the Drusberg, in the S., 7,412 feet; the Mythen, near the centre, 6,315 feet; the Righi, in the W., 5,905 feet; and the Rhone, in the N., 4,026 feet. The whole canton belongs to the basin of the Rhine, and the drainage flows into the Limmat and the lakes of Zürich on the N. and Lucerne on the W., by the rivers Wäggi, Sihl, and Muotta. Iron and gold are found in very small quantities. The climate is milder than in many other parts of Switzerland, as none of the mountains rise above the limit of perpetual snow. Very little of the soil is arable, and the country is almost wholly pastoral. The inhabitants are of German origin, and nearly all Roman Catholics.—Schwytz is one of the 3 original cantons that resisted Austria and formed the primitive confederation; and it had the honor of giving a name to the

whole country. The inhabitants made spirited efforts to resist the French in 1798, and suffered severely the following year when the war was carried into their country. Capital, Schwytz. Other places of historical interest are Küssnacht, Brunnen, Einsiedeln, and Morgarten.

SCIATICA, a neuralgic affection of the great sciatic nerve. (See NEURALGIA.)

SCIGLIO, or SCILLA (anc. *Scyllarim*, or *Scylla*), a promontory of S. Italy in Calabria Ultra, on the strait of Messina, in lat. 38° 14' 30" N., long. 15° 45' E. It is a bold headland, 200 feet high, the rocks at the base being deeply scooped out by the action of the waves. It is in the narrowest part of the strait, opposite the rocks and shoals of Charybdis, and was the terror of ancient mariners. (See CHARYBDIS AND SCYLLA.) In modern times portions of the rock have been removed by blasting, and the waters have worn a wider channel, so that the navigation is far less hazardous than of old.—The town of Sciglio (pop. 7,000), on the above promontory, has an active commerce and considerable fisheries, and its wine is highly renowned. It is said to have been founded by Anaxilas, tyrant of Rhegium.

SCILLY ISLANDS, a group at the W. entrance of the English channel, belonging to the county of Cornwall, about 80 m. W. S. W. from Land's End; lat. of the lighthouse on St. Agnes, 49° 53' N., long. 6° 20' W.; pop. in 1851, 2,627. The group is of circular form, about 80 m. in circumference, and contains about 140 islands in all, though only St. Mary's, Tresco, St. Martin's, St. Agnes, Bryher, and Samson are inhabited. They have steep and bold shores; but between the islands the water is shallow, and some of them are connected by strips of land at low water. The 6 inhabited islands have an aggregate area of 3,580 acres, but the soil is generally barren, and trees only grow in sheltered spots. Some oats and potatoes are raised on St. Mary's, and there is a little pasture land on the others. The inhabitants are mostly fishermen and sailors. The islands are governed by a court composed of 12 of the principal inhabitants, presided over by a military officer. The Scilly islands are generally supposed to be the Cassiterides or Tin islands of the ancients; but as that metal is not now found upon them, it is thought that the extremity of England was also included under that name. The group was sometimes used by the Romans as a place of banishment.

SCIO, SKIO, CHIO, or KHIÖ (anc. *Chios*; Turk. *Saki-Andassi*), an island of Asiatic Turkey, in the Grecian archipelago, off the coast of Asia Minor, from which it is separated by the strait of Scio, about 7 m. wide in its narrowest part; area, 508 sq. m.; pop. 162,000. The surface is rocky and uneven, being traversed by several limestone ridges, and the scenery is remarkably picturesque. There are beautiful valleys and several small rivers, and the country presents a scene of perpetual verdure, though only a small



part of the land is arable. The chief productions are silk, cotton, wool, different kinds of fruit, oil, and gum mastic, the last of which is the staple of the island. A great proportion of the inhabitants are Turks.—Chios is said to have been anciently peopled by Tyrrhenian Pelasgians and Leleges, after whom it was occupied by an Ionian colony, remaining a powerful state of the Ionian Greeks until their defeat by the Persians, 494 B. C., when it was laid waste. After the battle of Mycale (479) it became a member of the Athenian league; in 358 it recovered its independence; in 201 it was taken by Philip of Macedon, and it afterward became subject to Rome. In the early part of the 14th century the Turks captured the capital and massacred the inhabitants. From 1346 to 1566 it was in the hands of the Genoese. It then again fell under the dominion of the Turks, and, excepting a short interval during which it was subject to Venice, it has ever since been in their possession. During the Greek revolution its inhabitants rose against the Turks (1822), but were soon subdued by the capudan pasha with a powerful Ottoman fleet. Within 2 months 25,000 Sciotes, without distinction of age or sex, were put to the sword, 45,000 were sold into slavery, and 15,000 sought safety in other parts of Greece. By the end of August the former Christian population of nearly 104,000 was reduced to 2,000. These atrocities were revenged by the heroic Constantine Canaris, who in June, 1822, attacked the Turkish fleet in the harbor of Scio with fire ships, and destroyed the vessel of the capudan pasha, who lost his life in the flames. (See CANARIS.) In 1827-'8 a Greek force under Col. Fabvier, a French philhellenist, landed in Scio and attacked the Turkish garrison, but were compelled to withdraw without effecting any thing. The island is now recovering from the devastation of this war, and many of the exiled families have returned. The tragedian Ion, the sophist Theocritus, and the historian Theopompus were natives of the island.—Scio, the capital, is situated near the centre of the E. coast; pop. 14,500. It has a harbor formed by two moles, but obstructed by mud at the entrance, is defended by a castle, and is engaged in the manufacture of velvet, silk, and cotton. It is one of the cities which claim to be the birthplace of Homer.

SCIOTO, a river of Ohio, rising in Hardin co., and flowing first nearly E. and then S. by E. to Columbus, thence S. to the Ohio, which it joins at Portsmouth. It is about 200 m. long, and navigable 130 m. Its principal tributaries are the Olentangy or Whetstone river, which unites with it at Columbus, and Darby, Walnut, and Paint creeks. The Ohio and Erie canal follows its lower course for 90 m. The Scioto valley is famed for its fertility and wealth.

SCIOTO, a S. co. of Ohio, bounded S. by the Ohio river, and watered by the Scioto and Little Scioto rivers and branches; area, 504 sq. m.; pop. in 1860, 24,297. The surface is uneven

and the soil fertile. The productions in 1850 were 921,811 bushels of Indian corn, 83,984 of oats, and 5,123 tons of hay. There were 15 saw mills, 2 woollen factories, 5 tanneries, 5 newspaper offices, 21 churches, and 1,650 pupils in the public schools. In the E. part of the county iron is very plentiful, and a number of large furnaces and founderies are in operation. It is traversed by the Scioto and Hocking and Iron railroads, and the Ohio canal. Capital, Portsmouth.

SCIPPIO, a Roman patrician family belonging to the gens Cornelia. The name signifies a staff, and is said to have been given to a member of the Cornelian gens who performed the service of a staff in guiding his blind father. Many of the greatest men of Rome belonged to this family. The tomb of the Scipios, which was discovered in 1616 and excavated in 1780, is situated near the modern gate of St. Sebastian. The following are the most distinguished members of the family. I. PUBLIUS CORNELIUS SCIPIO AFRICANUS MAJOR, a Roman general, born about 234 B. C., died about 183. He was the son of P. Cornelius Scipio, who together with his brother Cneius Cornelius Scipio was defeated and killed in Spain by the Carthaginian generals Mago and Hasdrubal. He is first mentioned at the battle of the Ticinus in 218, where he is said to have saved his father's life. Two years afterward he was present at the battle of Cannæ, and Livy and other writers ascribe to his influence the prevention of the scheme entertained by the Roman nobles after that disastrous day of fleeing from Italy; but other and better authorities attribute this to Varro, the defeated general. In 212 he was made curule ædile. After the defeat and death of his father in Spain, being then 24 years of age, he offered to take command of the Roman armies in that province as proconsul, no one else being willing to undertake so difficult a task. He arrived in Spain in the summer of 210, and found the 3 Carthaginian generals, who were on ill terms with each other, in different parts of the peninsula. At the head of 25,000 foot and 2,500 horse, he made a rapid march from the Iberus (Ebro) to New Carthage (Carthagena), the capital of Punic power in Spain, in which were their treasure, their magazines, and their hostages. The city, remote from all succor, and ill defended by a garrison of 1,000 men, was soon taken. The captive Spaniards were dismissed with kindness, and in this manner he began his work of conciliating the natives. He returned to Tarraco, and remained quiet though not inactive during the remainder of the campaign, inasmuch as his force was not numerous enough to contend with the Carthaginian armies. In 209, having been strengthened by an alliance with several of the Spanish tribes, he took the field against Hasdrubal, the brother of Hannibal, over whom he is said to have gained a great victory at Bæcula; but he did not prevent the Carthaginian general from marching to the assistance of his brother in

Italy with his treasure, his elephants, and most of his infantry. No decisive events marked the campaign of the following year, except the storming by Lucius Scipio of Oringis, one of the towns into which the Carthaginians had distributed their army in garrisons. In 207 Scipio was prepared for active operations, and at the head of 45,000 foot and 8,000 horse he attacked a superior force of the enemy under Hasdrubal, the son of Gisco, and Mago, who had taken up a position near a town called Silpia or Elinga, but the precise situation of which is now unknown. The victory was complete, and with it passed away the Punic power in Spain. The natives came over in large bodies to the Romans, and the Carthaginians soon retired from the peninsula. Scipio was not content with this, but was anxious to carry the war into Africa. He had gained over Masinissa, an African ally of the Carthaginians who had come to Spain; and to win the support of Syphax, the Massæsylian king, he crossed over with only two quinquiremes to negotiate with him personally. There he found his old enemy, Hasdrubal, present with a similar intention, and was with him at the same entertainment. The Carthaginian prevailed principally through the charms of his daughter Sophonisba. On his return Scipio found Spain in a general revolt, but put it down in a short campaign marked by the merciless treatment of Illiturgi, and the desperation of the inhabitants of Astapa, who fell to a man. Recovering from a severe illness, he quelled a mutiny which had broken out in the Roman camp on the Sucro (Jucar) during his sickness, defeated the Spaniards, who had chosen the same opportunity to revolt, and had a secret interview with Masinissa, who was still in the Carthaginian service. In a short time the Carthaginians abandoned Spain entirely, and in 206 Scipio handed over the government to his successor, and returned to Rome. There he was received with enthusiasm, and in 205 was elected consul. He had now an opportunity of attacking the Punic power in Africa; but the senate would only allow him to go to Sicily, with the right of crossing into the Carthaginian territory if advantageous, but denied him an army. Volunteers, however, flocked to his standard, and in 204 he sailed with his army from Lilybæum, and landed near Utica. There he was joined by Masinissa, who had been in great measure stripped of his power by Syphax and the Carthaginians, but who nevertheless proved himself an invaluable auxiliary. The Romans began the siege of Utica, but the approach of an immense Carthaginian and Numidian army rendered it necessary to abandon the project. During the winter he amused Syphax with negotiations in regard to peace, but early in 203 by a stratagem burned the camps and almost annihilated the two armies opposed to him. With tremendous exertion the Carthaginians collected another army, which suffered another total defeat. Syphax was pursued by

Lælius and Masinissa and taken prisoner. The Carthaginians now recalled Hannibal and Mago from Italy, and made a truce with Scipio, which the Roman historians assert they wantonly broke. Hannibal was not indisposed to peace, but was compelled to take the field, and the two armies came into conflict near Zama (202). A complete victory for the Romans was the result, and with this defeat ended the second Punic war and the power of Carthage. Scipio returned to Rome in 201, and was welcomed with extraordinary enthusiasm. The surname of Africanus was given him, but he prudently declined the distinction of statues in the public places, and the election to the post of consul and dictator for life, which the people are said to have been anxious to confer. Disliked by a large majority of the senate, he took no part in the government for a few years. He was censor in 199, and consul a second time in 194, and had several times given him the title of *princeps senatus*. In 193 he was one of the 3 commissioners sent to mediate between Masinissa and the Carthaginians, and the same year, according to a celebrated though doubtful story, was ambassador to Antiochus the Great of Syria at Ephesus, where he met Hannibal, who is said to have paid him the following compliment: "Who was the greatest general?" asked Scipio. "Alexander the Great," was the reply of Hannibal. "Who was the second?" "Pyrrhus." "Who was the third?" "Myself." "What would you have said then," continued Scipio, "if you had conquered me?" "I should then have placed myself before Alexander, before Pyrrhus, and before all other generals," was the reply of Hannibal. In 190 he accompanied his brother Lucius as *legatus* in the war against Antiochus. On their return to Rome in 189, after the close of the war, his brother was accused of having received bribes from Antiochus, and of having appropriated the public moneys to his own use, and in 187, at the instigation of M. Porcius Cato, was required by the tribunes to give an account of the sums he had received. So he prepared to do, but Africanus snatched the papers from his hands and tore them up before the senate. Lucius was tried and found guilty, and was carried to prison, but was rescued by his brother in defiance of the laws. The tribune, Tiberius Gracchus, released Lucius from his sentence of imprisonment, and his clients and friends paid the fine. Emboldened by their success, his adversaries now ventured to attack Africanus himself. Scipio made no defence against their accusations, but simply stated his services to the state, and by this means was enabled to triumph over his enemies. He now retired to his estate at Liternum, where he spent the remainder of his life, as he had determined never to return to Rome. The accounts of Scipio's life are always confused, and often contradictory. His character was noble, and he alone of the Roman senate had no share in the miserable persecu-

tion which darkened the last days of Hannibal. His contempt of the laws and his haughty and uncompromising spirit made him many bitter enemies. Cornelia, the celebrated mother of the Gracchi, was his daughter. II. PUBLIUS CORNELIUS SCIPIO ÆMILIANUS AFRICANUS MINOR, a Roman general, born about 185 B. C., died in 129. He was the son of L. Æmilius Paulus, the conqueror of Macedonia, and was adopted by P. Scipio, the son of Africanus. He was present with his father at the battle of Pydna in 168, and in 151 went to Spain as military tribune at a time when the Roman arms had sustained great disasters in that quarter. There he gained a high reputation, and in 150 was sent to Africa to obtain elephants from Masinissa. In 149, on the breaking out of the 3d Punic war, he accompanied the army to Africa as military tribune, and saved it from the disasters which would naturally have resulted from the misconduct of its commander, Manilius. In 147 he was elected consul, the troops in Africa desiring him as their leader, and in the spring of 146 he took the city of Carthage, and ended the 3d Punic war. He returned to Rome the same year, celebrated a triumph, and received the surname of Africanus. In 142 he was made censor, and labored ineffectually to repress the growing luxury of the Roman people. He also changed at the conclusion of the lustrum the prayer for the extension of the commonwealth to one for the preservation of its actual possessions. In 139 he was tried before the people, but was acquitted, and the speeches he made on the occasion were long admired. After this he went on an embassy to Egypt and Asia, and in 134 he was elected to the consulship in order to carry on the war in Spain, which had been managed with little ability and less success. After bringing the disorganized troops into a proper state of discipline, he began the siege of Numantia, which was defended by the Spaniards with the utmost desperation. In 133 the inhabitants, worn out by famine, nearly all destroyed themselves to avoid falling into the hands of the conqueror. During this time the civil troubles in Rome had culminated in the murder of Tiberius Gracchus, the brother-in-law of Scipio. Notwithstanding their relationship, he approved the deed; and on his return to Rome in 132, being asked by the tribune, C. Papirius Carbo, in the assembly of the tribes, what he thought of the death of Tiberius Gracchus, he answered that he deemed him justly slain. This reply estranged him from the people, so that in 131 the votes of only two tribes were given him, when he wished to take the field against Aristonicus. Yet he had influence enough with the populace to defeat the bill of Carbo giving to the people the right of electing the same persons tribunes as often as they pleased. In order to prevent the agrarian law from being carried into effect, Scipio proposed that the distribution of the public lands should be taken out of the hands of the 3 commission-

ers who had been appointed, and confided to others. This provoked a bitter attack upon him, and upon his renewal of the assertion that Gracchus was justly slain, a cry arose among the multitude of "Down with the tyrant." That night he died, in what manner was never certainly known, though he was generally supposed to have been murdered. During the latter years of his life Scipio was considered the head of the aristocratic party, yet he supported in 139 the *lex Cassia tabellaria* against the aristocracy. He was one of the most accomplished literary men of his time, well acquainted with Greek philosophy and literature, and the friend and patron of the historian Polybius, the philosopher Panætius, and the poets Lucilius and Terence. III. QUINTUS CÆCILIUS METELLUS PIUS, a Roman political leader and general, killed himself in 46 B. C. He was the son of P. Cornelius Scipio Nasica and the adopted son of Metellus Pius, and in consequence he has been called P. Scipio Nasica, or Q. Metellus Scipio. He first appears in 63 B. C., when he came to Cicero by night to inform him of the conspiracy of Catiline. He became tribune in 60, was accused of bribery by his opponent, and defended by Cicero, and in 53 was a candidate for the consulship, and one of the leaders of the Clodian mob opposed to Milo. When the senate allowed Pompey to be made sole consul, that leader chose him, Aug. 52, as his colleague, and from that time Scipio became one of his most zealous partisans. He labored assiduously to destroy the power of Cæsar, and it was in great measure through his efforts that the senate was induced to take the steps which led to the breach between the aristocratic and democratic parties at Rome, and to the civil war. In the division of the provinces Syria fell to his lot, and, according to the account of Cæsar, his extortion, oppression, and misgovernment exceeded the customary iniquity of the Roman governors. In Greece he joined Pompey after Cæsar's repulse at Dyrrachium, and after the battle of Pharsalia fled to Africa, where he took command of the army of Attius Varus, and continued in that country the extortionate and oppressive conduct which he had begun in Syria. In Dec. 47, Cæsar crossed the Mediterranean, and in April, 46, routed the forces of Scipio and Juba, king of Numidia, at the battle of Thapsus. In attempting to escape to Spain, Scipio was overtaken by the fleet of P. Sittius, and, anxious not to fall into the hands of Cæsar, stabbed himself and sprang into the sea. His abilities were not great, and the influence he possessed was due to his connection with two of the leading families of Rome, and his relationship to Pompey, who was his son-in-law.

SCIRE FACIAS, in law, a judicial writ founded upon some record, and requiring the person against whom it is brought to show cause why the person bringing it should not have the advantage of such record, or (in the case of a *scire facias* to repeal letters patent)

why the record should not be annulled and vacated. It is so called from the words of the writ (when in Latin, as all writs originally were) to the sheriff: *Quod scire facias præfatio*, &c., and can only issue from the court having the record upon which it is founded. It is said by Sir Edward Coke to be "accounted in law in the nature of an action," and it is sometimes expressly called an action. It is most commonly used for the purpose of reviving a judgment after the lapse of a certain time, or on a change of parties, or otherwise to have execution of the judgment, in which cases it is merely a continuation of the original action. It is also used, but more rarely, as a method of proceeding against a debtor's bail, when the original debtor has absconded, commanding them to show cause why the plaintiff should not have execution against them for his debt or damages and costs; and also on a recognizance to the commonwealth. In detinue after judgment the plaintiff is entitled to a writ of *scire facias* against any third person in whose hands the goods may be, commanding him to show cause why the goods should not be delivered; and it lies to obtain execution against the indorser of an original writ, in case of the avoidance or inability of the plaintiff to pay the costs recovered against him by the defendant. It also lies where an execution has been returned into court as satisfied, but it afterward appears that the lands levied upon did not belong to the judgment debtor, or the levy was otherwise imperfect or insufficient; and in England it may be obtained by the patron or owner of an advowson for the purpose of removing a usurper's clerk improperly admitted by the bishop. It is further used as a means of repealing letters patent, and in this case it is an original proceeding or action. It was made a question in the district court of New York, in the case of *ex parte* Wood, whether the process to be awarded to repeal a patent was not in the nature of a *scire facias* at common law. The district judge decided that the proceeding was summary upon a rule to show cause, and that no process of *scire facias* was afterward admissible. Upon an appeal to the supreme court of the United States, this decree was reversed and the district court directed by *mandamus* to enter upon the record the proceedings in the case antecedent to the granting of the rule to show cause, and to award process in the nature of a *scire facias* to the patentee to show cause why the patent should not be repealed; and upon the return of the process the court was to proceed to try the case upon the pleadings of the parties and the issue of law or fact joined therein as the case might be; and if it were an issue of fact, the trial was to be by jury according to the course of the common law.—The action of *scire facias* is the proper method of proceeding to ascertain judicially and enforce the forfeiture of a charter by a corporation for default or abuse of power, when such corporation is a legally existing

body capable of acting, but who have abused their power; though when the corporation is a body *de facto* only, and on account of a defect in the charter or for any other reason cannot legally exercise its powers, the proceeding is by *quo warranto*.

SCISSORS. See CUTLERY.

SCOPAS, a Greek sculptor, born in the island of Paros, flourished during the first half of the 4th century B. C. He was a contemporary of Praxiteles, and with him stands at the head of what is known as the later Attic school of sculpture, in contradistinction to the severer school of Phidias. He wrought chiefly in marble, and among his most famous works are the slabs from the mausoleum of Halicarnassus representing a battle of Amazons. (See HALICARNASSUS.) The celebrated group of Niobe and her children in the Florentine gallery, and the *Venus Victrix* in the museum at Paris, are also attributed to Scopas. He was occasionally employed on important architectural works, including the temple of Athena Alea in Arcadia and that of Diana at Ephesus. His masterpiece, according to Pliny, was a group representing Achilles conducted to the island of Leuce by sea divinities.

SCORESBY, WILLIAM, an English navigator, born at Cropton, Yorkshire, May 8, 1760, died in 1829. He was removed from school at an early age, and employed in agriculture, till in 1779 he resolved on a seafaring life. After engaging in an armed storeship, suffering capture by the Spaniards, making his escape from Spain, and aiding his father on the farm for two years, he began in 1785 a career of unprecedented success in the Greenland whale fishery. He was promoted to the position of second officer in his sixth voyage, and to the command of the ship *Henrietta* in 1791. He retired with a competency in 1823, having held command in 80 voyages. He made numerous improvements in whale-fishing apparatus and operations, and invented the observatory attached to the main topmast, called the "round topgallant crow's nest," which was generally adopted by arctic navigators. He published a pamphlet in 1817, containing plans for the improvement of the town and harbor of Whitby.—WILLIAM, D.D., son of the preceding, an English arctic explorer, divine, and savant, born at Cropton, Oct. 5, 1789, died at Torquay, March 21, 1857. He began his career as a seaman at the age of 10 years by concealing himself in his father's ship when it set out on a Greenland voyage, and was promoted through all the gradations of the service, attaining the rank of chief mate in his 16th year. The Scoresbys, respectively as commander and chief mate of the *Resolution*, in 1806 sailed to lat. 81° 30', the highest northern latitude that had then been reached by any vessel. In 1807 he volunteered to assist in bringing the Danish fleet from Copenhagen to England. Meantime he devoted the winter months assiduously to study at Whitby, and in 1806 and 1809 at the univer-

sity of Edinburgh, attending specially to the natural sciences and the application of mathematics to navigation and marine surveying. In 1810 he succeeded his father in command of the *Resolution*, and in his first voyage captured 30 whales. In 1817 some communications which he made to Sir Joseph Banks, president of the royal society, induced the latter to memorialize the government on the prosecution of arctic discovery; and thus from his suggestion proceeded the series of explorations in the north which have distinguished the present century. He furnished important information to the admiralty, but did not accompany either of the two expeditions which were fitted out in 1818, since the etiquette of the naval service was opposed to giving him command of a vessel, and he declined the position of pilot which was offered him. He had made 17 voyages to the Spitzbergen or Greenland whaling grounds, when he published the results of his experience and observation in an admirable work, the "Arctic Regions" (2 vols., 1820), characterized by Sir R. I. Murchison in 1858 as "containing, beside a vast amount of statistical information relative to the whale fishery, then the most important nursery for our seamen, so great a mass of scientific observation that it is still a text book of nautical science." It includes a history of early arctic voyages, narratives of personal adventure, and treatises on the hydrography, meteorology, and natural history of the arctic regions. He was the first to attempt scientific observations on the electricity of the atmosphere in high northern regions, and his experiments made with an insulated conductor 8 feet above the head of the main topgallant mast, connected by a wire with a copper ball, attached by a silken cord to the deck, are still regarded with interest from their novelty and ingenuity. In a visit to the island of Jan Mayen he obtained a remarkable proof of the equatorial current. He found on the shore pieces of drift wood bored by a *ptenus* or *pholas*, which, he concluded, had been borne from a transpolar region, since neither of these animals pierces wood in the arctic countries. The notion of a constantly open polar sea he always believed to be chimerical. His most important discoveries were in 1822, when in the ship *Baffin* he explored the eastern coast of Greenland, a tract entirely unknown. In his "Journal of a Voyage to the Northern Whale Fishery" (Edinburgh, 1828), he describes his survey of the coast, the wonderful atmospheric refractions there seen, and the rocks, plants, animals, and human habitations which he examined. His wife died during this voyage, and on his return he abandoned nautical pursuits, and began to prepare himself for holy orders. He became a student at Queen's college, Cambridge, was graduated as bachelor of divinity in 1834, subsequently receiving the degree of D.D., became chaplain of the mariners' church at Liverpool, and published "Discourses to Seamen." In 1839 he was appointed vicar of

Bradford, a large parish in Yorkshire, where he labored several years till his failing health obliged him to retire to Torquay. He became a fellow of the royal society in 1824, and was subsequently elected a correspondent of the section of geography and navigation of the French academy of sciences. He furnished occasional contributions to the "Edinburgh Philosophical Journal," the "Reports of the British Association," and other scientific publications. He was chiefly interested in magnetic phenomena, and published the results of his observations in "Magnetical Investigations" (3 vols., London, 1839-'48). He discovered that by hammering a steel bar, when resting in a vertical position on a bar of iron, he could impart to it intense magnetic power; experimented on the influence of the iron of vessels upon the magnetic needle; inferred that the best position for the compass was at the mainmast head; and for the purpose of prosecuting his researches made a voyage to the United States in 1847, and to Australia in 1858. The narrative of his Australian voyage was published after his death by Archibald Smith. His lectures on "Zoistic Magnetism" describe experiments by which he attempted to identify mesmeric and magnetic phenomena. Among his other publications were "Considerations on the Franklin Expedition," "Memorials of the Sea," "Sabbaths in the Arctic Regions," and a biography of his father (London, 1851). His life has been written by his nephew, R. E. Scoresby-Jackson (8vo., London, 1861).

SCORPION, an articulate animal of the class *arachnida* or spiders, order *pulmonaria* or those which breathe by air sacs, and genus *scorpio* (Linn.). The body is long, the head and thorax in a single piece, the thorax and abdomen intimately united and followed by 6 joints of nearly equal breadth, and then by 6 others very narrow, and forming what is called the tail; the last joint ends in a sharp curved sting, connected with a gland secreting an oily, whitish, poisonous fluid, which is discharged by 2 small openings near the end; the body is clothed with a firm, coriaceous skin composed of chitine. The mandibles, according to Siebold, are wanting, the parts usually called such being only antennae transformed into prehensile and masticatory organs; the chelicerae have 3 joints, move vertically, and under them have the 1st pair of jaws changed into long prehensile palpi, like extended arms, ending in a didactyle claw or pincer, as in the lobster, endowed with a delicate sense of touch; there are 8 legs, 8-jointed, ending each in a double hook; the eyes are 6 or 8, one pair of which is often median and larger than the others; at the base of the abdomen are 2 laminated organs, called combs, which Tulk thinks serve to cleanse the palpi, tarsi, and tail; from their situation near the genital openings, some think them concerned in the reproductive act. On the lower and lateral parts of the abdomen are 8 spiracles or stigmata, opening into as many

pulmonary sacs, each enclosing 20 delicate laminae for respiratory purposes; the heart consists of 8 chambers, and at each end is prolonged into an arterial trunk; there is also a venous system; the blood is colorless, and contains a few cells and granules; no blood vessels have been discovered on the pulmonary laminae, and the blood is probably effused into the parts surrounding these sacs or lungs. The intestine is straight and narrow, with the anal opening on the penultimate caudal segment; the liver is very large, and salivary glands distinct; the urinary organs are ramified tubes opening into the cloaca; the reproductive organs are double, at the base of the abdomen, and the sexes distinct; the 2 ventral nervous cords proceeding from the head form 8 ganglia, the last 4 belonging to the tail. Scorpions are carnivorous, feeding on insects which they hold by their palpi, sting to death, and then suck the blood; they are generally found in dark places in warm climates, and in some tropical parts of the old world are so numerous as to be a constant source of terror to the natives, even rendering whole districts uninhabitable; they live on the ground, concealing themselves under stones, in ruins, in the interior of houses, and even in beds; they run very fast, keeping the tail elevated and ready to strike in any direction, either on the offensive or defensive; the females are larger and less numerous than the males. Under certain circumstances they kill and devour their own progeny; they renew their skin several times, and can live very long without food; gestation is said to continue nearly a year, the young being born alive and in succession. The scorpion has been known from the earliest antiquity, as its place in the ancient zodiac proves; it was the symbol of the goddess Selk in the Egyptian mythology, and Anubis is often represented as facing it as if to destroy its influence; Pliny gives a long account of the fabled powers of this animal.—The *S. Europæus* (Linn.), of southern Europe, is about an inch long, of a brown color, with the feet and end of tail yellowish, and the palpi angular and heart-shaped; the female produces her young alive in succession, carrying them on her back for a few days and protecting them for about a month; it has 6 eyes, and 9 teeth in the comb; its sting is productive of no serious consequences. The reddish scorpion (*S. occitanus*, Latr.) is a little larger, of a yellowish red color, with the tail a little longer than the body with raised and finely notched lines; there are 8 eyes, and more than 30 teeth in the comb; it is found in Spain and in N. Africa, but not with the preceding species; its sting is more to be feared, and may be dangerous to persons of weak constitution. The black scorpion (*S. afer*, Linn.) is blackish brown, with the claws rough and a little hairy and the anterior edge of the corslet strongly emarginated; there are 8 eyes, and 13 teeth in the comb. It is found in Ceylon and the East Indies, and attains a length of 5 or 6 inches; the sting is much dreaded, and is

attended with alarming and sometimes fatal symptoms; these are of a peculiar character, and indicate to the physician the nature of the disease and the proper method of treatment; the best remedy has been found to be ammonia externally and internally, to neutralize the poison in the first case, and to guard against prostration in the other; other caustics and stimulants are used, and embrocations of various kinds of oil.

SCOT, REGINALD, an English author, died in 1599. He was educated at Oxford, although he never took a degree, and passed the greater part of his life on his paternal estate near Smeeth in Kent. His "Discoverie of Witchcraft" (1584), in which he combats the popular opinion that the devil has power of controlling the course of nature, and exposes many of the tricks of conjurers, was assailed with vehemence from various quarters, and burned by the common hangman. James I. wrote his "Demonologie," he informs us, "chiefly against the damnable opinions of Wierus and Scot, the latter of whom is not ashamed in public print to deny there can be such a thing as witchcraft." Scot's work nevertheless passed through 8 editions, and was translated into French and German. It is now exceedingly rare. Scot was fond of gardening, and in 1576 published a "Perfect Platform of a Hop Garden." Hallam calls him "a solid and learned person, beyond almost all the English of that age."

SCOTER. See DUCK.

SCOTLAND, a N. E. co. of Mo., bordering on Iowa, and intersected by the Wyaconda, North Fabius, and Middle Fabius rivers; area, 450 sq. m.; pop. in 1860, 8,873, of whom 132 were slaves. The surface is mostly prairie, and the soil fertile. The productions in 1850 were 236,370 bushels of Indian corn, 14,461 of wheat, 40,345 of oats, and 53,375 lbs. of butter. Capital, Memphis.

SCOTLAND, the N. part of the island of Great Britain, and one of the 3 kingdoms of the British empire in Europe. It consists of a mainland and several groups of islands on the N. and W. coasts, and is bounded N. and E. by the North sea, S. by England, from which it is partly separated by the river Tweed, and W. by the Atlantic ocean. The mainland extends from lat. 54° 38' to 58° 41' N., and from long. 1° 45' to 6° 14' W. The extreme N. point of the islands is Unst, in the Shetland group, lat. 60° 50', and their most westerly point St. Kilda, in the Hebrides, long. 8° 35'. The greatest length of the mainland, from Dunnet Head in the N. to the Mull of Galloway in the S., is about 280 m.; and its greatest breadth, from Buchanness in the E. to Ardnamurchan point in the W., about 160 m. The sea coast is extremely irregular, and so frequently and so deeply indented that its total extent is estimated at 3,000 m. By these indentations the breadth of the mainland is in some places greatly reduced, the distance between Alloa on the E. coast and Dumbarton on the W. being only 32

m., and between Loch Broom on the W. and the Dornoch frith on the E. only 24 m. On the N. are the Orkney and Shetland islands, together constituting a county (including Fair island, lying between them), and each group containing a population of about 31,000. On the W. are the Hebrides or Western islands, divided into the outer and inner groups, with a total population of about 117,000. (See **HEBRIDES, ORKNEY ISLANDS, and SHETLAND ISLANDS.**) The island of Stroma lies between the Orkneys and the mainland. On the E. coast are May, Inchkeith, and Inchcolm islands, in the frith of Forth, and Inchcape or the Bell Rock, off the frith of Tay.—The mainland of Scotland is geographically divided into two distinct regions, the highlands N. of the Grampian mountains, and the lowlands S. of that range. Politically, the kingdom is divided into 33 counties, of which 13 are southern, 10 central, and 10 northern. The central counties are separated from the southern by the friths of Forth and Clyde and the grand canal which connects them, and from the northern by the Grampian mountains. The population of these counties in 1851 and their shire towns are given in the following table:

Counties.	Pop. in 1851.	Shire towns.
<b>SOUTHERN.</b>		
Edinburgh or Midlothian . . .	259,435	Edinburgh.
Haddington or East Lothian . . .	86,886	Haddington.
Berwick . . . . .	36,297	Greenlaw.
Roxburgh . . . . .	51,642	Jedburgh.
Dumfries . . . . .	78,128	Dumfries.
Kirkcudbright . . . . .	48,121	Kirkcudbright.
Wigton . . . . .	48,830	Wigton.
Ayr . . . . .	189,853	Ayr.
Renfrew . . . . .	161,091	Renfrew.
Lanark . . . . .	580,169	Lanark.
Linlithgow or West Lothian . . .	80,185	Linlithgow.
Peebles . . . . .	10,738	Peebles.
Selkirk . . . . .	9,809	Selkirk.
<b>CENTRAL.</b>		
Fife . . . . .	158,546	Cupar.
Kinross . . . . .	8,924	Kinross.
Clackmannan . . . . .	22,951	Clackmannan.
Stirling . . . . .	96,287	Stirling.
Dumbarton . . . . .	45,108	Dumbarton.
Bute . . . . .	16,698	Rothsay.
Argyle . . . . .	59,298	Inverary.
Perth . . . . .	188,660	Perth.
Forfar . . . . .	191,264	Forfar.
Kincairdine . . . . .	84,598	Stonehaven.
<b>NORTHERN.</b>		
Aberdeen . . . . .	212,083	Aberdeen.
Banff . . . . .	64,171	Banff.
Elgin or Moray . . . . .	88,959	Elgin.
Nairn . . . . .	9,956	Nairn.
Inverness . . . . .	96,500	Inverness.
Ross . . . . .	82,707	{ Dingwall.
Cromarty . . . . .	25,793	{ Cromarty.
Snthard . . . . .	83,709	Dornoch.
Caithness . . . . .	62,588	Wick.
Orkney and Shetland . . . . .		Kirkwall, Lerwick.

The total area is 31,324 sq. m., of which the islands comprise about 5,000. The population has been steadily increasing for more than a century, chiefly by natural growth, the accessions from abroad being very few. In 1700 the number of inhabitants was estimated at 1,000,000; in 1755, at 1,265,000. The first government census was in 1801, and the result was 1,608,420 inhabitants. By the successive censuses at intervals of 10 years it was found that

the population increased in each decade from 10 to 13 per cent. The enumeration of 1811 gave 1,805,864; of 1821, 2,091,521; of 1831, 2,364,386; of 1841, 2,620,184; of 1851, 2,888,742; and of 1861, 3,061,251, in which year there were 111½ females to 100 males. Scotland contains 225 cities and towns, of which 83 are royal and municipal burghs. Edinburgh is the metropolis and the seat of the chief courts, but Glasgow is the largest city. Beside these the following places, arranged in the order of their populousness, had each in 1851 upward of 10,000 inhabitants: Dundee, Aberdeen, Paisley, Greenock, Leith, Perth, Kilmarnock, Ayr, Arbroath, Montrose, Airdrie, Dunfermline, Dumfries, Stirling, and Kirkcaldy. The kingdom contains about 900 parishes.—Geologically Scotland is divided into 3 distinct regions: 1. The southern or older palæozoic, which includes the region between the southern boundary and a line running E. N. E. from Girvan on the frith of Clyde to the Siccar point on the E. coast. It consists chiefly of lower silurian strata, which have been forced up in various anticlinals and convolutions, and broken through in several places by feldspar porphyries, trap rocks, granite, and syenite. The mountain range called the southern highlands, which crosses the island from St. Abb's Head on the North sea to Loch Ryan, is formed by these strata. These mountains seldom rise above 2,000 feet, and are clothed to the summit by grass or moss. On the English border are the Cheviots, a group consisting of feldspar porphyry and trap rocks. The principal valley of this region is that of the Tweed, which embraces some very fertile land. West of the valley of the Tweed are the vales of the Liddel, Esk, and Annan, the lower portions of which are peat bogs, the site of ancient forests, which have recently been in great part drained and cultivated. 2. The central or newer palæozoic region embraces the basins of the friths of Clyde, Forth, and Tay, and has an area of about 5,000 sq. m. It consists of the devonian or old red sandstone and the carboniferous formations, with the surface extensively covered by trap rocks. The coal measures are largely productive in rich beds of bituminous coal, in iron ores, and fire clay. Much of the coal is of the cannel character, and is largely exported for gas works and domestic consumption in other countries. The Boghead cannel is especially famous for its valuable properties in producing gas and coal oil. The iron ores are worked upon an immense scale, especially the variety known as the black band; and the product of the blast furnaces of this region has long been exported in large quantities to the United States, where it is well known by the name of Scotch pig. South of the Forth are the Pentland hills, and north of it the Kilpatrick, Campsie, Ochil, and Sidlaw hills, a range of trap rocks. Among the remarkable isolated trap hills in this district are Arthur's Seat and the Lomond hills, and the rocks on



which are built the castles of Edinburgh, Stirling, and Dumbarton. 3. The northern division, or the region of the crystalline and metamorphic rocks, comprises the whole of Scotland N. and W. of the central division, or beyond a line drawn from the frith of Clyde on the S. W. to Stonehaven on the opposite coast. This region has an area of 19,000 sq. m., and comprises the highlands. Its southern boundary is a narrow zone of clay slate, which is extensively quarried for roofing slates. North of this is an irregular band of mica slate, which commences in the peninsula called the Mull of Cantyre, and extends in a N. E. direction to the E. coast. Beyond this is an extensive formation of gneiss covering about 11,000 sq. m. This is throughout broken by granite, sometimes in small veins and in other places in huge mountain masses, forming some of the highest summits in Scotland. Among the other igneous rocks of this region, the most important is porphyry, which forms the mountains of Glencoe and the summit of Ben Nevis, the highest point of the British islands. Next on the W. coast is the red sandstone formation, with the superposed quartzite and limestone, constituting a series of lofty mountains, of which the principal peaks are about 3,000 feet in height. The N. and E. extremity of the mainland is mostly covered by the old red sandstone or devonian formation, which spreads N. over the Orkneys and part of Shetland. On the N. E. coast are never secondary deposits of limited extent, the most important of which are patches of lias and oolite in Aberdeenshire, Elgin, Cromarty, and Sutherland, and greensand and chalk flints in Aberdeenshire. Lias and oolite beds are widely diffused on the W. coast and around the shores of some of the islands. In the islands of Skye, Mull, and Morven, and in Lorn on the mainland, these beds are covered by trap rock, showing that for a long period this part of Scotland was subject to volcanic action.—Scotland is so mountainous that there is scarcely any part of the country in which mountain ranges are not visible in some direction. There are 5 principal chains nearly parallel to each other, and having a general direction from N. E. to S. W. 1. The northern highlands commence in detached groups at the southern border of Caithness, and cover a large portion of the counties of Sutherland, Ross, and Inverness. They separate the streams which flow into the Atlantic from those that reach the North sea through the Moray frith. The principal summits are Ben Attow, 4,000 feet; Ben Wyvis, 3,720; Ben Dearg, 3,550; Ben More, 3,230; Ben Cliberich, 3,165; and Morven, 2,334. 2. The Grampians, extending from Loch Awe on the Atlantic coast to near Stonehaven and Aberdeen on the coast of the North sea, with their ramifications, form, in general, the boundary between the highlands and lowlands, with a height of from 2,000 to 4,000 feet. The principal summits are Ben Macdui, 4,295 feet; Cairn-

toul, 4,245; Cairngorm, 4,090; Ben Avon, 3,826; Ben-y-Gloe, 3,690; Schiehallion, 3,564; and Ben Lomond, 3,190. Ben Nevis, N. of the W. extremity of the Grampians, and sometimes reckoned as belonging to them, is 4,406 feet high. 3. The Ochil and Sidlaw range is separated from the Grampians by the valley of Strathmore, and consists of 8 small chains which extend from Forfarshire to Stirlingshire, and form the N. watershed of the basins of the rivers Tay, Forth, and Clyde. The Sidlaw hills extend from the river Dean to Perth on the Tay. Their highest summit, the hill of Sidlaw, is 1,400 feet high. The Ochils, between Stirling and the frith of Tay, attain an elevation of 2,300 feet, and the Campsie Fells in Stirlingshire are 1,500 feet high. 4. The Lammermoor and Pentland range is separated from the third range by the frith of Forth, and forms the S. boundary of the Forth basin. This range consists of the Lammermoor hills between Haddington and Berwick, with an elevation of 1,600 feet; the Moorfoot hills, a western continuation of the Lammermoors; the Pentland hills in Midlothian, 1,878 feet high; and lastly Tinto hill in Lanarkshire, 2,316 feet high. 5. The Cheviot and Lowther range, or the southern highlands, extends from the English border to Loch Ryan, and separates the basins of the Clyde and the Tweed on the N. from those of the Solway and the Tyne on the S. The highest summits of this range are Broadlaw, 2,741 feet; Cheviot peak, 2,684; Hart Fell, 2,635; and Lowther hill, 2,520. The glens or deep and rocky valleys among the Scottish mountains are famous for the wild beauty and grandeur of their scenery. Chief among them is Glenmore, the "great glen," which extends in a straight line 60 m. from Loch Eil on the W. coast to Beaulieu frith on the E. It contains 3 long lochs or lakes, whose aggregate length is 37 m.—The rivers of Scotland are comprised in 8 principal basins, which are those of the Tweed, the Forth, the Tay, the Dee and Don, the Ness and Moray basin, the Linnhe basin, the Clyde, and the Solway basin. The first 5 discharge their waters into the North sea, and the remaining 3 into the Atlantic. The largest rivers are the Tay, Clyde, Forth, Tweed, South Esk, and Dee. They are not navigable by large vessels for any considerable distance above their estuaries, with the exception of the Clyde, which for about 12 m. has been rendered navigable by artificial deepening and embankment. The Scottish rivers however are valuable to commerce by their fisheries, which supply the chief cities of Great Britain with salmon. Several of the smaller streams, as the Teviot, Gala, Ettrick, Yarrow, Doon, Ayr, Carron, and Leven, are famous in poetry and romance. The lakes of Scotland (or lochs, as they are called in the Scottish dialect) are numerous, and are mostly situated in the glens of the highlands. They are generally of a length altogether disproportioned to their breadth, and

the scenery around them is celebrated for grandeur and beauty. The following is a list of some of the most noted, arranged in the order of their size, and with the number of square miles embraced in the area of each: Lomond, 45; Ness, 30; Awe, 30; Shin, 25; Maree, 24; Tay, 20; Archaisg, 18; Shiel, 16; Lochy, 15; Laggan, 12; Morrer, 12; Fannich, 10; Ericht, 10; Naver, 9; Earn, 9; Leven, 7; Ken, 6; and Katrine, 5. A still more characteristic feature of the country is formed by the sea lochs, or friths as they are called, deep inlets which indent the coast. The most extensive of these on the E. coast is the Moray frith, N. of which is Cromarty frith, celebrated for its beauty and for its excellence as a harbor of refuge from storms. On the N. coast is Loch Eriboll, also a good harbor, and on the W. coast the two lochs Broom, Loch Ewe, Loch Torridon, Loch Carron, Loch Alsh, Loch Sunart, 30 m. long, and Loch Linnhe, which with its branches surpasses in extent all we have yet mentioned. The frith of Clyde however is the largest and most useful of these inlets, of which we have enumerated only a small part.—The climate of Scotland is so tempered by the influence of the ocean that, notwithstanding the high northern latitude of the country, the thermometer rarely falls to zero, nor does it often rise above 80° in summer; the mean temperature is 47°. The prevalent winds are from the W., and the record of meteorological observations shows that during more than two thirds of the year the direction of the wind is from N. W. or S. W. These winds bring with them so much moisture, that in some places among the mountains the annual fall of rain is nearly 100 inches, while in other parts of the country it is only 24 inches.—The flora of Scotland does not differ materially from that of England, though there are some peculiar plants which grow only in certain restricted localities. The number of flowering plants and ferns is estimated at 1,200. Among those of a peculiarly Scottish type may be mentioned the globe flower, crowberry, *trientalis Europæa*, *primula farinosa*, *haloscias Scoticum*, and *mercurialis maritima*. There are 37 species of indigenous land quadrupeds, among them the red, fallow, and roe deer, the hare, rabbit, fox, badger, otter, wild cat, weasel, and hedgehog. Bears and wolves have been exterminated, the last wolf having been killed in 1680. A few specimens of the native wild cattle (*bos urus*) are preserved in a park belonging to the duke of Hamilton. Of birds about 270 species have been noted, one half of them water birds, of which great numbers are found on the coasts. The golden eagle inhabits the mountains, and the pheasant, ptarmigan, blackcock, grouse, and partridge are abundant. Reptiles are almost unknown. Fish abound in the lakes, rivers, and adjacent seas, and a great variety of shell fish occurs, among which is a mussel found in the rivers containing in some cases tolerably large pearls.—The people are divided

into two great and distinct stocks, differing from each other in language, manners, and dress, viz.: the highlanders and the lowlanders, the former living in the mountainous north and the latter in the south. The highlanders wear a short coat, a vest, and a kilt or philabeg, a kind of petticoat reaching scarcely to the knees, which are left entirely uncovered, the lower parts of the legs being covered with short hose. These garments are usually made of tartan, a kind of checkered stuff of various colors. On the head is worn a bonnet somewhat resembling a hat without a rim. Sometimes the plaid, a large piece of tartan, is worn around the body in the manner of the Roman toga. The language of the highlanders is the Erse or Gaelic, a Celtic dialect bearing no analogy to the English. (See ERSE.) Both the peculiar language and the peculiar costume of the highlands are gradually falling into disuse, the people adopting the manners, dress, and dialect of the lowlands. The clans or tribes into which they were formerly divided have also ceased to have any legal existence, and the hereditary chiefs who once governed them with almost absolute sway have no longer any authority. The highlanders also, who were at no very remote period noted for their warlike and predatory habits, have ceased to carry arms about their persons, and are as peaceable and orderly as any part of the British population. They are still however fond of a military life, and enlist in great numbers in the British army, of which they form some of the most distinguished regiments. The peculiar language of the lowland Scots closely resembles the English, though some regard it as a dialect of the Scandinavian. It is mixed with Anglo-Saxon words and idioms, and with a few French terms which have not found their way into English. This dialect prevails not only in the lowlands, but in Caithness, Orkney, and Shetland in the N. The lowlanders, especially those of the towns, do not differ much from their English fellow subjects in appearance, manners, or character, and the two nations have been rapidly assimilating during the present century. Among the peasantry, however, many traits are preserved of a character essentially Scotch. They are marked by an athletic, bony frame, broad and high cheek bones, and a hard, weather-beaten countenance. In disposition they are grave, serious, and reflecting; in their habits frugal, industrious, and persevering. Honesty, piety, shrewdness, caution, and general good sense are their distinguishing traits of character. They have a metaphysical turn of mind, and are fond of religious controversy. They are strongly attached to their country, though very ready to quit it in pursuit of fortune. No people have shown a more resolute determination in defence of civil and religious freedom. Their chief vices are intemperance and unchastity, the number of illegitimate births in the kingdom being in some recent years as high as 9 per cent. of the whole, while in several of the

agricultural counties it reached the enormous proportion of 17 per cent. They are celebrated for their taste in music and poetry. Notwithstanding the smallness of its population, Scotland has produced an array of names eminent in literature and science which scarcely any other nation can surpass. Among the poets may be mentioned Drummond, Ramsay, Burns, Thomson, Beattie, Scott, Campbell, Pollok, Lockhart, Montgomery, Wilson, Motherwell, and Aytoun; among the historians, Buchanan, Burnet, Hume, Robertson, Russell, Watson, Mackintosh, Alison, and Carlyle; among the philosophers, Adam Smith, Reid, Kames, Stewart, Brown, and Sir William Hamilton; among the men of science, Napier, Ferguson, Gregory, Watt, Playfair, Maclaurin, Leslie, Sir David Brewster, Hugh Miller, Sir Charles Lyell, and Sir Roderick I. Murchison; and among miscellaneous writers, Boswell, Smollett, Mackenzie, Blair, McOrrie, Chalmers, Jeffrey, and Brougham. Bruce, Park, Clapperton, Ross, and Livingstone are among the Scottish travellers, and Munro, Cullen, Abercrombie, Abernethy, William and John Hunter, Liston, Christison, John Bell, Sir Charles Bell, Sir James Clark, and Sir John Forbes among Scottish physicians and surgeons.—The agriculture of Scotland has attained to a high pitch of excellence, and in many parts of the country is conducted with a skill and energy not surpassed anywhere in the world. The climate is in many respects unfavorable to agriculture, its chief defects being the low summer temperature, the lateness of the spring, the occasional prevalence of N. E. winds and fogs, and heavy rain in the latter part of summer, which often causes great damage to the crops, and a cold, wet harvest. Still, the Lothians, the carse of Stirling, Falkirk, and Gowrie, the Merse, Clydesdale, and Strathearn, large portions of Fifeshire, Strathmore, Annandale, Nithsdale, Kyle, Cunningham, and of the low grounds along the Moray and Cromarty friths, are so well tilled and productive that they bear comparison with the best lands in England. The whole system of cultivation in them is generally of a very perfect character. The grain is usually sown by the drill, and much of the crop is reaped and all of it threshed by machinery. In the rich and level plains of the Lothians and Stirlingshire, where the climate is comparatively dry, the land is worth more in crop than as pasture, and the following is the common rotation of crops: 1, oats; 2, beans or potatoes; 3, wheat; 4, turnips; 5, wheat or barley; 6, grass. In these districts guano and other light manures are liberally applied to the crops. In the higher and more moist districts a different system prevails; the land lies longer under pasture, the following being the rotation of a 6 years' course: 1, oats; 2, turnips; 3, oats or barley; 4, 5, and 6, grass. Rearing and feeding of cattle are carried on to a large extent in these districts, as the most profitable way of consuming the grass and green crops. In the mountains, heaths and nat-

ural grasses occupy the soil, affording a scanty herbage for sheep or cattle. Much care has been taken and great skill shown in improving the breeds of stock and in distributing them over the most eligible pasture lands. The black-faced highland sheep is kept in the wildest and stormiest mountain region of the north, as best suited to withstand the climate. The Cheviot breed is little inferior in the same respect, and has been largely introduced into the north. These animals are exposed to great hardships during snow storms, and usually receive no other food than what they find on the hills. In 1857 the number of occupants of land for farming purposes in Scotland was 43,432, and the number of acres under a rotation was 3,556,572. The estimated gross amount of the principal crops in the same year was 6,154,986 bushels of wheat, 6,564,420 of barley, 82,750,768 of oats, 1,037,760 of beans and peas, and 671,778 of bere, a species of barley. The product of potatoes was 430,468 tons, and of turnips 6,690,109. In the same year there were in the country 185,409 horses, of which 161,418 were employed in agriculture; 974,437 cattle, of which 803,912 were milch cows; 5,688,168 sheep, and 146,354 swine.—A large part of the population of Scotland is employed in the coal and iron mines. There are upward of 400 coal mines in the counties of Lanark, Ayr, Fife, Clackmannan, Haddington, Edinburgh, Linlithgow, Stirling, Dumbarton, Renfrew, Dumfries, Peebles, and Perth, and the number of persons employed in them amounted in 1858 to 82,000, producing 8,926,249 tons of coal. In the same year the number of iron works, mostly in Lanark and Ayr, was 32, with 177 furnaces, producing annually 925,500 tons. In 1859 there were 9 lead mines, yielding 1,586 tons of lead and 4,882 ounces of silver.—The fisheries constitute a very important branch of Scottish industry. Before the export of salmon to England grew to be considerable, it was so common that in some parts of the country domestic servants were accustomed to stipulate that they should not be compelled to eat it more than 2 or 3 times a week. The fishery is now chiefly in the Tweed, Forth, Tay, Dee, Don, Findhorn, Spey, Ness, and other rivers on the E. coast. The herring fishery has long been carried on with success on a large scale, and the Scotch herrings are considered equal to those of any other country. In 1857 the total product of this fishery was 666,934 barrels, of which 580,813 were cured, and 807,275 barrels exported to the continent. In the same year the cod and ling fisheries yielded 157,706 cwt. and 4,393 barrels, of which 84,310 cwt. were exported. The herring, cod, and ling fisheries in 1857 employed 11,858 boats, with an aggregate tonnage of 82,175. The total number of persons employed in these fisheries was 90,548. The value of the boats employed was £265,569, of the nets £373,963, and of the lines £63,183; total, £702,715.—The linen manufacture was the earliest and until lately the most important branch of the

manufacturing industry of Scotland. Its principal seats are Dundee, Kirkcaldy, Arbroath, Forfar, Montrose, Aberdeen, and Dunfermline. In 1856 there were 168 factories, 278,304 spindles, and 4,011 power looms. The hands employed numbered 81,722, of whom 8,881 were males and 23,891 females. In recent years the cotton manufacture has excelled that of linen in extent and value. Its principal seats are in the counties of Lanark and Renfrew, and it all centres in or is dependent upon the city of Glasgow. In 1857 there were 152 cotton factories, with 2,041,129 spindles and 21,624 power looms, employing 84,698 hands, of whom 7,609 were males and 27,080 females. The woollen manufacture, though less considerable than either the linen or the cotton, is more widely diffused, being carried on in 24 of the 33 counties. The cloth made is chiefly of a coarse kind, and the principal seats of the manufacture are Galashiels, Hawick, Paisley, Bannockburn, Stirling, Kilmarnock, Jedburgh, and Aberdeen. In 1856 there were 202 factories, with 298,363 spindles and 800 power looms, employing 10,175 hands, of whom 5,179 were males and 4,996 females. A manufacture of silk, employing 887 persons in 1856, is carried on at Paisley and Glasgow, in which cities there are 6 factories with 80,244 spindles. Whiskey and ale are made in enormous quantities, and constitute the favorite beverage of the people. In 1850 there were 167 licensed distilleries, and the quantity of proof spirits distilled in that year was 10,846,684 gallons, and in 1857 18,299,409 gallons. In 1857 there were 228 brewers of strong beer, 11 brewers of table beer, 28 retail brewers, and 15 brewers from sugar. The malt consumed was 1,228,524 bushels. Edinburgh is the chief seat of the beer manufacture. Paper was made in 1857 to the amount of 46,673,595 lbs., by 51 paper mills, and the manufacture is now rapidly increasing. The most important manufactures beside those already mentioned are leather, soap, earthenware, glass, hardware, hats, and combs. Ship building is extensively carried on at the chief ports, and steamboats of iron and wood, steam engines, and every other kind of machinery, are made in great quantities, especially on the Clyde. —The shipping of Scotland on Dec. 31, 1859, comprised 1,174 sailing vessels under 50 tons and 2,042 above 50 tons, with an aggregate burden of 571,492 tons; steam vessels, 297, aggregate burden 75,010 tons. The number of sailing vessels entered coastwise in 1859 was 13,943 (19 foreign), tonnage 877,760; steam vessels 6,440, tonnage 1,361,982. The number of sailing vessels entered from the colonies in 1857 was 585 (25 foreign), tonnage 248,368; cleared 570, tonnage 257,621. The number of steamers entered from the colonies was 10, tonnage 2,426; cleared 37, tonnage 13,325. Sailing vessels entered from foreign ports in 1857, 3,936 (1,357 British), tonnage 550,320; cleared for foreign ports, 4,951 (2,093 British), tonnage 678,687. Steam vessels entered from

foreign ports, 391 (45 foreign), tonnage 128,058; cleared, 434 (80 foreign), tonnage 186,715. Though the mountainous nature of the surface is peculiarly unfavorable to internal communication, Scotland is well supplied with roads, canals, and railroads. Her turnpike roads, of which there are about 7,000 miles open, are said to be the best in the world. The greatest of her canals is the Caledonian, which affords a passage for ships from the North sea to the Atlantic ocean. (See CALEDONIAN CANAL.) Another great canal connects the opposite coasts of the island, and extends from Glasgow to Edinburgh in two divisions; the first, called the Forth and Clyde canal, was finished in 1790, and is 35 m. long; the second, called the union canal, was finished in 1822, and is 81 m. long. Paisley canal, from Glasgow through Paisley to Johnstone, is 11 m. long; Monkland canal, between Glasgow and Airdrie, 12 m.; Glenkens canal, from the mouth of the Dee through Loch Ken to Dalry, 26 m. The first railroad in Scotland was opened in 1810 between Kilmarnock and Troon, a distance of 10 m. In Jan. 1859, there were 20 main lines with 1,842 m. open for passage, and several hundred miles in process of construction. Edinburgh and Glasgow are the centres from which they mostly radiate. Two lines connect Glasgow with Carlisle and the west of England; Edinburgh sends one line to the east and the other to the west of England; two lines pursuing different routes connect Edinburgh and Glasgow; and most of the remaining lines connect those two cities with the large towns on the E. coast, viz., Stirling, Perth, Dundee, Arbroath, Forfar, Montrose, Aberdeen, and Inverness. The total number of passengers conveyed in 1857 was 14,738,508; the receipts from passengers were £916,697, from goods £1,584,781, total £2,501,478. The average cost per mile of the Scottish railroads, previous to 1848, was £28,225; since that period it has been only £7,243. The total amount of money raised for railroads prior to 1858 was £33,668,115.—In general government Scotland forms an integral part of the United Kingdom, and stands on the same footing with England except in regard to law and law courts and the form of church government, upon which points express stipulations exist in the articles of union between the two kingdoms. To the imperial parliament the Scottish nobles elect of their own number 16 peers to represent them in the house of lords. The counties send 80 members to the house of commons, one for each county with the exception that Ross and Oromarty are conjoined into one electoral district, as are Elgin and Nairn, while Kinross, Clackmannan, and some adjoining portions of Perth and Stirling, form also an electoral district. The towns which are parliamentary burghs send in the aggregate 23 representatives. At the head of the judiciary is the court of session, which is supreme in civil matters, and consists of 13 judges. (See EDINBURGH, vol. vi. p. 756.) The court holds two terms or sessions annually,

during which it sits 5 days in the week. The average number of cases annually decided is about 1,900. The court of justiciary, which is supreme in criminal causes, consists of 5 of the judges of the court of session. The high court of justiciary sits in Edinburgh, but circuit courts are held to the number of 4 in Glasgow and 2 in the other circuit districts annually. This court has jurisdiction in all important criminal charges, and the decisions of its high court are without appeal. Its presiding officer is the president of the court of session, who when sitting in this court is termed the lord justice-general. Causes are tried by the verdict of a jury of 15 persons, who are not required to be unanimous, and who, when the case is not clear, can bring in a verdict of "not proven," which leaves the accused liable to be tried again for the same offence should additional evidence be found. The judges of this court when upon circuit possess a civil jurisdiction by way of appeal. The chief local courts are those of the sheriffs, of which there is one in each county, the business of the court being conducted before an officer called the sheriff-substitute, who acts for a sheriff-principal, who has within certain limits a power to revise his proceedings, while there are certain acts both judicial and executive which must be performed by the sheriff-principal. Formerly there was a sheriff-principal to each county, but recently the counties have been grouped into districts, and one sheriff-principal serves for all the counties in a district. The sheriff's court has no jurisdiction in questions of land rights nor of personal *status*, as marriage or legitimacy, but in other matters of civil right there is no limit in pecuniary value to the causes that may come before it. The proceedings in the civil department of this court are chiefly conducted in written pleadings. The sheriff has a separate court for the recovery of small debts, in which the procedure is oral and summary. In the criminal department of the sheriff's court only those cases are tried that are not deemed of sufficient importance to be brought before the court of justiciary. Finally, the magistrates of municipal corporations and justices of the peace appointed by the king have jurisdiction both in civil and criminal matters in a limited sphere. In many particulars the law of Scotland differs from that of England, and bears much affinity in theory and practice to the systems of the continent, especially to the old system of judicature in France, on which it was modelled.—The public revenue of Scotland for the year ending March 31, 1858, was £7,300,000, and was derived from customs, excise, stamps, land and assessed taxes, property and income tax, and the post office. The assessed taxes comprise duties on inhabited houses, servants, carriages, horses, dogs, game, &c., for the support and relief of the poor.—The established church of Scotland is the Presbyterian, from which there are two seceding bodies, the Free church, and the United

Presbyterian church. In 1851 the established church had 1,183 places of worship, with 767,080 sittings; the Free church 889 places, with 495,335 sittings; and the United Presbyterian 465 places, with 288,100 sittings. Other denominations had 858 places of worship, with 284,282 sittings. The most numerous of these were the Independents, 192 places, 76,342 sittings; Episcopal, 134 places, 40,022 sittings; Roman Catholics, 117 places, 52,766 sittings; Baptists, 119 places, 26,086 sittings; and Methodists, 82 places, 22,441 sittings. There were 20 Mormon places of worship with 3,182 sittings.—By a statute passed in 1695 it was enacted "that there be a school founded and a schoolmaster appointed in every parish by advice of the presbyteries; and to this purpose that the heritors do in every congregation meet among themselves and provide a commodious house for a school, and modify a stipend to the schoolmaster, which shall not be under 100 merks (£5 11s. 1½d.), nor above 200 merks (£11 2s. 2½d.), to be paid yearly at two terms." This was the foundation of a system of common schools, under which the Scottish people in the 18th century became more generally educated than any other in Europe. In 1803 the salary of the schoolmaster was raised so that it should not be less than £16 13s. 4d. per annum. In 1828 it was again raised so that it should not be less than £25 13s. 3½d. A further increase was made in 1859, dependent somewhat on the price of oatmeal. In addition to the salary fixed by law, the teachers receive fees from their pupils, commonly however not averaging for each pupil more than 5s. a year. Beside the parish schools there are 231 schools maintained by the "Society in Scotland for Propagating Christian Knowledge," at an annual expense of about £3,000. Beside the schools supported by the established church, there are 617 maintained by the Free church, and a number by the Episcopal church. There are also throughout the country a large number of private schools supported by the parents of the pupils. In the cities and larger towns there are grammar or high schools and academies, and there are 5 normal schools for the training of teachers. By the census of 1851 it appeared that there were then in Scotland 5,242 day schools, of which 3,349 were public and 1,893 private. The number of pupils attending the public schools was 280,045 (161,754 males and 118,291 females); attending private schools, 88,472 (43,594 males and 44,878 females); total number of pupils, 368,517, or one to every 7.84 inhabitants. The total income of the schools, so far as returns were made, was £173,436, of which £62,089 was from permanent endowments, £21,284 voluntary contributions, £6,643 grants from government, £64,471 payments by scholars, and £18,409 from other sources. The average remuneration of the male teachers was £55, of the female teachers £21. The total number of male teachers was 4,821, of whom 2,903 were mas-

ters, 558 paid monitors and pupil teachers, and 1,365 unpaid teachers. The total number of female teachers was 1,792, of whom 894 were mistresses, 241 paid monitors and pupil teachers, and 657 unpaid teachers. Of adult evening schools at the same period there were 438, with 9,500 male and 5,571 female pupils, and 629 teachers, of whom 526 were males and 103 females. Of the pupils in these schools 4,386 were artisans, 2,397 factory operatives, 561 agricultural laborers, 553 domestic servants, 349 weavers, 843 coal and iron operatives, 287 bleachers, 278 warehousemen, 385 miners, and 166 clerks. The number of Sunday schools was 3,803, with 292,549 pupils, of whom 135,435 were males and 157,114 females, and 25,411 teachers. Of these schools 1,095 belonged to the established church, 1,243 to the Free church, and 558 to the United Presbyterian church. There were at the same time in the country 221 mechanics' and literary institutions. The higher seats of education in Scotland are the universities of Edinburgh, Glasgow, Aberdeen, and St. Andrew's. The first of these institutions had in 1860 a principal and 34 professors, classified under the 4 faculties of arts, divinity, laws, and medicine. The number of students was 1,464, viz.: in arts, 647; divinity, 85; laws, 236; medicine, 496. The university of Glasgow had in 1860 a principal and 22 professors, and 1,127 students. The university of Aberdeen has a principal and 21 professors, and in 1860 had 713 students. The university of St. Andrew's, the oldest in Scotland, consists of a chancellor, rector, 2 principals, and 12 professors, and in 1860 had 145 students. The periodical press of Scotland has long been distinguished for its vigor and ability. The "Edinburgh Review," "Blackwood's Edinburgh Magazine," the "North British Review," and "Chambers's Journal," stand in the front rank of that species of literature; and the first two especially attained in the first half of this century a reputation that has no superior of its kind. As a place of publication Edinburgh is the only rival of London in the British empire, and has long been celebrated for its issues of books. The number of periodicals published in 1858 in that city was 20, and there were in the same year about 70 printing offices with 1,200 men employed in them.—Scotland was known to the Romans by the name of Caledonia, and was inhabited by 21 savage tribes of shepherds and hunters, who were polygamists and idolaters, their religion being druidical, and their habits so disorderly that the Roman writers call them robbers. They were exceedingly brave and hardy, and their arms were short spears, daggers, and shields. Their habitations were miserable huts, and they disdained the use of clothes. To their Roman invaders they offered a fierce and obstinate opposition. In the reign of the emperor Vespasian, in the latter half of the 1st century of our era, Julius Agricola led a Roman army beyond the friths of Forth

and Clyde, and penetrated, after a desperate resistance on the part of the natives, to the frith of Tay, while at the same time his fleet explored the coasts, and probably first made certain the fact that Britain was an island. He was unable however to complete the conquest of the country, and finally withdrew his forces behind a chain of forts with which he connected the friths of Forth and Clyde. Subsequently several other attempts were made by the Romans to subdue the north of the island, the most memorable of which was that of the emperor Septimius Severus, who in 207 led an expedition as far as the Moray frith, where he made a peace with the Caledonians, who observed the treaty only so long as the emperor remained in arms among them. On his withdrawal to the south they rose again in insurrection, and a second expedition was preparing to march for their subjugation when the emperor died at York (Eboracum) in 211. During his residence in Britain Severus reconstructed a wall originally built by Hadrian between the Tyne and the Solway; and on the final abandonment of Britain by the Romans in 446 they repaired this rampart and that between the friths of Clyde and Forth. From this period for several centuries the predominant race of Scotland is known in history as Picts. (See PICTS.) Between the two walls in the province of Valentia dwelt 5 tribes who had become practically Romanized and civilized, and after the withdrawal of the Romans formed a union and established a kingdom which was called *Regnum Cumbrense*, or more frequently the kingdom of Strathclyde. Of this kingdom at the beginning of the 6th century the famous Arthur Pendragon was the sovereign. In this half-fabulous period of Scottish history 38 Pictish kings are enumerated, from Drest, who succeeded to the throne in 451, to Bred, who died in 843. The most important event of this Pictish period was the arrival in Scotland of the Saxons in 449, and their eventual conquest and settlement of the lowlands, where one of their leaders, Edwin, founded the present capital, Edinburgh (Edwinsburgh). About 503 Scotland was also invaded by the Scots, a Celtic tribe from Ireland, who settled on the W. coast and established a kingdom beginning with the reign of Fergus, one of their chiefs, and continuing under a series of kings, of whom little is known till the accession of Kenneth Macalpin in 836, under whom the Scoto-Irish or Scotch became the dominant race in the country, which now began to be called Scotland from them. During the reign of Kenneth the Picts disappeared as a people, being according to some authors massacred by the orders of Kenneth, but according to a more probable theory amalgamated with and absorbed by the Scots. The most important event of the Pictish period was the conversion of the natives to Christianity in the 6th century by St. Columba and other missionaries from Ireland. In 866, under the reign of Constantine, the second of

the successors of Kenneth, the Danes, led by the vikings or sea kings, began to invade Scotland. Their incursions for plunder and conquest continued with little intermission, in spite of frequent repulses, till 1014, when, after a series of defeats inflicted on them by King Malcolm II., they gave up the contest. Meantime the Scottish kingdom was gradually enlarged by the peaceful annexation of Cumberland about 950, by the conquest of Strathclyde about 970, and of Lothian from England in 1016. This last acquisition was owing to the valor and energy of Malcolm II., the expeller of the Danes, who after a vigorous reign was succeeded in 1033 by his grandson, the "gracious Duncan" of Shakespeare, who 6 years later was assassinated by Macbeth at Bothgowanan, near Elgin. Macbeth himself was defeated and slain in 1054, after a vigorous reign of 15 years. A civil war ensued, which terminated in the elevation of Malcolm III. to the throne in 1057. During his reign England was conquered by the Normans, and Malcolm, who had married the Saxon princess Margaret, the sister of Edgar Atheling, the heir of the Saxon line, invaded and ravaged the north of England. In retaliation William invaded Scotland in 1072 with so powerful a force that Malcolm submitted without a struggle, and performed homage to William as his feudal superior, for, as the English subsequently alleged, his whole kingdom, while the Scotch maintained that the homage was rendered only for the 12 manors which Malcolm held in England. The question long continued to be a source of dissension between the two kingdoms. It led to a war between Malcolm and William Rufus, in which, in 1093, the Scottish king was slain in a battle near Alnwick castle. Of his successors the most conspicuous were Alexander I., David I., Malcolm IV., William the Lion, Alexander II., and Alexander III., in whose reigns, terminating in 1285, Scotland made rapid progress in power and civilization. The reign of William the Lion, which lasted 48 years, from 1165 to 1214, was memorable for his capture by Henry II. of England, and his disgraceful treaty with that monarch in 1174, by which he regained his liberty and surrendered the independence of Scotland, agreeing to become the vassal of Henry and to receive English garrisons in Edinburgh, Stirling, and other important places. This state of dependence continued 15 years till the death of Henry, when his successor, Richard Cœur de Lion, anxious to obtain money for his crusade to the Holy Land, agreed for the sum of 10,000 marks to renounce all claim on the part of the English crown to supremacy over Scotland. William the Lion was succeeded by his son Alexander II., one of the wisest and most vigorous of the Scottish monarchs, whose son Alexander III., dying in 1285, left the crown to an infant daughter, Margaret, the maiden of Norway. On her voyage from Norway to take possession of the throne, Margaret sickened and died at Orkney. Various competi-

itors for the crown appeared, the principal of whom were John Baliol and Robert Bruce. The ambitious Edward I. of England, who had designs of his own on the kingdom, offered or was invited to mediate between them, for which purpose a conference was held at Norham in 1291 between the English monarch and the principal nobility and clergy of Scotland. Edward had brought the whole force of his kingdom in arms, and before giving his decision required the Scottish barons to swear fealty to him as their lord paramount. Overawed by his power, his claim was admitted and an instrument signed acknowledging the English king as feudal superior of Scotland. Edward then awarded the crown to Baliol, and by studied insults and indignity soon goaded his vassal king into rebellion, upon which Scotland was overrun by a powerful English army, Baliol taken prisoner and sent to the tower of London, and the principal strongholds of the kingdom captured. At this juncture, when the subjugation of Scotland seemed to be fully effected, and nearly all the great nobles had submitted to the conqueror, Sir William Wallace of Ellerslie appeared in arms for the independence of his country at the head of a small band of followers, and continued the contest with heroic energy for several years, until he was at length betrayed into the hands of Edward, who caused him to be cruelly executed at London. The struggle was continued by Robert Bruce, grandson of the competitor of Baliol, at first with marked ill fortune, but finally with distinguished success, culminating in the great battle of Bannockburn, June 25, 1314, where the English chivalry were utterly routed and dispersed by a much inferior force of Scots. The war however continued 14 years longer, during which England was 12 times invaded and scourged with fire and sword, till her rulers were compelled to acknowledge the independence of Scotland. Bruce died in 1329. During the century which succeeded the sceptre was swayed by three kings, one of whom, Robert II., was the son of the steward of Scotland, whence the origin of the name of the royal house of Stuart, of which he was the first sovereign. His successor, Robert III., devolved the cares of government upon his eldest son, the duke of Rothesay, who quarrelled with his uncle, the duke of Albany, and was starved to death by order of that powerful magnate. The king's second son, James, on his voyage to France, was captured by the English and carried a prisoner to England, where he was detained for 19 years, during the greater part of which the government of Scotland was administered by Albany as regent. In 1424 the captive prince was released, and returning to Scotland began under the title of James I. a brief reign of great energy, devoted mainly to reducing to order the powerful and turbulent nobility, whose feuds and ambitions had for nearly a century kept the country in confusion. He made many great reforms, instituted the



court of session and other tribunals, and introduced law and order in the place of license and turbulence. His career was cut short by assassination in 1437, and he was succeeded by his son James II., a boy of 6 years, during whose minority the kingdom was torn by factions, one of which was headed by the earl of Douglas, whose immense possessions made him the most powerful baron of Scotland. The king on attaining his majority assumed the reins of government with vigor and decision, and effectually humbled the house of Douglas, whose chief he stabbed with his own hand in the castle of Stirling in 1451. The king subsequently took part in the civil wars of England on the side of Henry VI., and was accidentally killed while besieging Roxburgh in 1460. His son James III. was then a boy in his 8th year, and during his minority the country, in spite of the turbulence of the nobles, was comparatively prosperous, while after his accession civil war raged almost constantly between the king and his brother the duke of Albany, who assumed the title of Alexander, king of Scotland, and was supported by the Douglasses, by the lord of the Isles, and many other great nobles. Albany was finally defeated and slain in 1483; but a new rebellion broke out a few years later, the chiefs of which arrayed the king's son, a youth of 17, against his father, and the latter was defeated and slain at Sauchie-burn in 1488. The rebellious son, who succeeded under the title of James IV., proved to be an able and energetic sovereign. He maintained a magnificent court, promoted the civilization of the country, and curbed the power of the nobles and of the great highland chiefs, the most considerable of whom, the lord of the Isles, having rebelled, was promptly subdued and stripped of his extensive dominions, which were forfeited to the crown. In 1513 he was imprudently led by French influence, which had long been very great in Scotland, to declare war against Henry VIII. of England, and to invade that kingdom with a powerful army. He was met by the earl of Surrey at Flodden, Sept. 9, and defeated and slain, together with so many chiefs, nobles, and common soldiers, that all Scotland was plunged in mourning; and to this day the defeat is regarded by the Scotch as the greatest disaster in their national annals. A long series of misfortunes followed during the minority of James V., the son of the late king, whose mother, Margaret Tudor, daughter of Henry VII. of England, was made regent, and speedily became involved in quarrels with the nobles, which added the miseries of civil strife to those of foreign war. She had rashly married the earl of Angus, the head of the house of Douglas, and that faction retained possession of the young king's person till in his 17th year he freed himself from their yoke and assumed the reins of government, and, after a struggle in which the Douglasses were supported by England, succeeded in driving them into

exile. During his reign Protestantism made great progress in Scotland, though severely persecuted by Cardinal Beaton, the Catholic primate. In 1542 James became involved in war with England, and died in the same year of a broken heart caused by the mutinous conduct of the nobles, which had led to a disgraceful defeat of his army at Solway Moss. The crown descended to his only child, a daughter 8 days old, the celebrated and unfortunate Mary, queen of Scots. For the history of Scotland during her reign, see MARY STUART. Mary was driven into exile in England in 1568, and her absence left her natural brother, the regent Murray, master of the kingdom. Her son James VI. had been crowned king in 1567 while yet an infant. During his minority, after Murray's assassination in 1570, the earls of Lennox, Mar, and Morton were successively regents, till in 1581 Morton was tried and executed for treason, and the king took the government into his own hands. During all this period the kingdom was distracted by civil war, which had gradually assumed a religious character from the contest between Catholicism and Protestantism for supremacy, in which the Protestants were finally successful, and Presbyterianism became the established religion of Scotland. James, by his descent from Margaret Tudor, the mother of James V., was the heir to the English crown on the death of Queen Elizabeth, and accordingly in 1603 he succeeded to the throne of England. This event, which united the two nations under one head, closed the history of Scotland as a separate kingdom, though it was not till 1707 that the countries were legislatively united. During the great civil wars of England in the 17th century Scotland was the scene of many important events, of which notices will be found in the article ENGLAND. Since the union the most remarkable occurrences in her annals are the two rebellions of 1715 and 1745, the object of which was the restoration of the exiled Stuarts to the throne.

SCOTT, the name of 10 counties in the United States. I. A S. W. co. of Va., bounded S. by Tennessee, touching Kentucky on the N., and intersected by Clinch river and the N. fork of Holston river; area, 620 sq. m.; pop. in 1860, 12,072, of whom 490 were slaves. The Clinch mountain and several parallel ridges traverse the county. The soil is generally good and adapted to grazing. Bituminous coal and iron are abundant. The productions in 1850 were 15,722 bushels of wheat, 319,240 of Indian corn, 106,342 of oats, and 74,086 pounds of butter. There were 20 grist mills, 7 wool carding mills, 20 churches, and 1,000 pupils attending public schools. The "Natural Tunnel," perforated through a lofty ridge by a branch of the Clinch river, is in this county. The value of real estate in 1856 was \$1,590,568, an increase of 116 per cent. since 1850. Capital, Estillville. II. A central co. of Miss., drained by several tributaries of

Pearl river; area, 600 sq. m.; pop. in 1860, 8,140, of whom 2,960 were slaves. Large forests of pine abound, and the soil is sandy and sterile. The productions in 1850 were 95,500 bushels of Indian corn, 57,500 pounds of rice, and 881 bales of cotton. There were 7 churches, and 157 pupils attending public schools. Capital, Hillsborough. III. A W. co. of Ark., drained by the Fourche La Pave, Petit Jean, and other tributaries of the Arkansas river; area, 870 sq. m.; pop. in 1860, 5,145, of whom 215 were slaves. The surface is uneven and the soil generally fertile. The productions in 1850 were 128,460 bushels of Indian corn, 18,156 of oats, 368 bales of cotton, and 33,593 lbs. of butter. There were 5 grist and saw mills, 6 cotton-ginning mills, and 250 pupils attending public schools. Capital, Booneville. IV. A N. E. co. of Tenn., bordering on Ky., and drained by the Big South fork of the Cumberland river; area, 300 sq. m.; pop. in 1860, 3,519, of whom 59 were slaves. It is traversed by the Cumberland mountains, and has an abundance of timber. The productions in 1850 were 66,421 bushels of Indian corn, 5,895 of oats, and 28,962 lbs. of butter. There were 3 churches. Capital, Huntsville. V. A N. co. of Ky., drained by tributaries of the Kentucky river; area, 240 sq. m.; pop. in 1860, 14,417, of whom 5,744 were slaves. The surface is generally hilly and the soil extremely fertile. Fine blue limestone is found in great abundance. The productions in 1850 were 1,089,100 bushels of Indian corn, 156,368 of oats, and 1,612 tons of hemp. There were 2 newspaper offices, 26 churches, and 815 pupils attending schools. Capital, Georgetown. VI. A S. E. co. of Ind., drained by affluents of White river; area, 180 sq. m.; pop. in 1860, 7,304. The surface is flat except in the W., where are some high hills called the Knobs. The soil is of good quality. The productions in 1850 were 251,375 bushels of Indian corn, 20,417 of wheat, 65,855 of oats, and 2,451 tons of hay. There were 16 churches, and 3,226 pupils attending public schools. The Jeffersonville railroad crosses the county. Capital, Lexington. VII. A W. co. of Ill., bounded W. by Illinois river, and intersected by Plume and other creeks; area, 255 sq. m.; pop. in 1860, 9,070. The surface is mostly level and well timbered, and the soil very fertile. Coal and limestone abound. The productions in 1850 were 762,950 bushels of Indian corn, 84,232 of wheat, 89,917 of oats, 3,823 tons of hay, and 112,436 lbs. of butter. There were 15 churches, 1 newspaper office, and 1,844 pupils attending public schools. Capital, Winchester. VIII. A S. E. co. of Mo., separated from Illinois on the E. by the Mississippi river, and bordered W. by White-water river; area, 370 sq. m.; pop. in 1860, 5,247, of whom 503 were slaves. The surface is uneven and the soil generally fertile. There are vast cypress swamps in the S. part. The productions in 1850 were 169,100 bushels of

Indian corn, 3,700 of wheat, and 9,865 of oats. There were 9 churches, and 225 pupils attending public schools. Capital, Benton. IX. An E. co. of Iowa, bounded E. and S. by the Mississippi, separating it from Illinois, and N. by the Wapsipinicon; area, 450 sq. m.; pop. in 1860, 25,960. It has an elevated rolling surface, thinly timbered, and a fertile soil. Coal and limestone are found. The productions in 1859 were 664,263 bushels of Indian corn, 336,386 of wheat, 73,848 of oats, 102,417 of potatoes, 16,958 tons of hay, 84,494 lbs. of butter, and 3,005 galls. of sorghum molasses. In 1850 there were 11 churches, 2 newspaper offices, and 2,041 pupils attending public schools. Capital, Davenport. X. A S. E. co. of Minn., bounded N. W. by the Minnesota river; area, 680 sq. m.; pop. in 1860, 4,594. The surface is undulating, with a variety of prairie land and large forests, and the soil is fertile. Timber is the most valuable product. Capital, Shakopee.

SCOTT, MICHAEL, a learned Scotchman and reputed wizard of the 13th century, born probably in Fifeshire, died, according to the common account, in 1291. He was probably educated at some foreign university, and passed many years of his life in foreign countries, residing for some time at the court of the emperor Frederic II., at whose request he wrote a number of works. A few treatises on natural history, the occult sciences, and other subjects are attributed to him, but on somewhat questionable authority. As a magician or wizard his reputation was European, and traditions of his wonderful powers are to this day extant in Scotland; some of these have been employed with fine effect by Sir Walter Scott in his "Lay of the Last Minstrel," the second canto of which is mainly occupied with the opening of the wizard's grave in Melrose abbey. Dante introduces him in the *Inferno*, and he is mentioned by Boccaccio and other Italian authors. Camden states in his *Britannia* that in his time Scott's magic books were still preserved at Ulme, in Cumberland, and adds that he was a monk of that place about the year 1290, who from his reputation for abstruse learning was looked upon commonly as a conjurer.

SCOTT, THOMAS, D.D., an English clergyman, born at Braytoft, Lincolnshire, in 1747, died at Aston Sandford, Buckinghamshire, April 16, 1821. He was the son of a farmer, and at the age of 16 was apprenticed to a surgeon and apothecary, but soon returned to farming. Having studied for the church, he was ordained in 1773 by the bishop of Lincoln, became a curate in Buckinghamshire, and through the influence of John Newton was converted to Calvinism. In 1781 he removed to Olney, and in 1785 to London, where he was the chaplain of the Lock chapel. In 1801 he was appointed rector of Aston Sandford, where he continued till his death. His principal works are: "A Commentary on the Bible" (6 vols. 4to.), very widely known; "Defence of Calvinism" against

Bishop Tomline; and a small work entitled "The Force of Truth."

SCOTT, SIR WALTER, a Scottish poet and novelist, born in Edinburgh, Aug. 15, 1771, died at Abbotsford, Sept. 21, 1832. He was a younger son of Walter Scott, a writer to the signet, who was allied to the border family of the Scotts of Harden, which in its turn was an offshoot from the great house of Buccleuch—a circumstance in which the poet took much pride. His mother was Anne Rutherford, the daughter of a medical professor in the university of Edinburgh. Being a delicate child, he was sent at 3 years of age to reside on his paternal grandfather's farm of Sandyknowe, in Roxburghshire, a region abounding in traditions of the border wars, to which he was known even in his infancy to be an eager listener. In 1779 he returned to Edinburgh greatly improved in health, with the exception of a lameness which appeared in his second year and never afterward left him; and soon after he became a pupil in the high school of Edinburgh, whence, in Oct. 1783, he was transferred to the university. At school or college he gained no distinction as a scholar, although many of the anecdotes related of his dulness are pure fictions, but was an indefatigable reader of romances, old plays, poetry, travels, and whatever other miscellaneous literature came within his reach. The perusal of ballad literature, and especially of Percy's "Reliques of Ancient Poetry," which he first read in his 12th year, had an important influence in shaping his literary tastes and character, the predominant feature of which was a reverence for the past, and particularly the Gothic portion of it. Thenceforth he became keenly susceptible to the charms of natural scenery. "The romantic feelings," he tells us, "which I have described as predominating in my mind, naturally rested upon and associated themselves with the grand features of the landscape around me; and the historical incidents or traditional legends connected with many of them gave to my admiration a sort of intense impression of reverence, which at times made my heart feel too big for its bosom." The vocation of romance writer and poet of chivalry, upon which Scott would have willingly entered at once, seemed however to be indefinitely postponed by his apprenticeship in May, 1786, to legal business in the office of his father. After 6 years devoted to professional study, and, to a considerable extent, to imaginative reading and composition, in July, 1792, he was called to the Scottish bar, but still found opportunities for his favorite literary recreations and the calls of society. His earliest literary efforts in print were metrical versions of Bürger's "Leonora" and "Wild Huntsman" (4to., 1796), encouraged by the execution of which he composed from his rich stores of legendary lore the ballads, "Glenfinlas," the "Eve of St. John," and the "Grey Brother," published in 1799 in M. G. Lewis's "Tales of Wonder." About the

same time he produced a translation of Goethe's *Gotz von Berlichingen*. He had meanwhile (Dec. 1797) been married to Miss Charlotte Margaret Carpenter, a young lady of French extraction, and by the commencement of the present century was in the enjoyment of a comfortable income, derived partly from his wife's annuity and his own patrimony, and partly from the office of sheriff depute of Selkirkshire, to which he had then recently been appointed. His professional emoluments were respectable for an advocate of his standing, and from an unwillingness to rely upon his pen to any considerable degree for a support, he continued for several years to cultivate literature as a relaxation from business. In 1802 appeared the first two volumes of his "Minstrelsy of the Scottish Border," a collection of ancient ballads, which may be said to have occupied him from early childhood, and which contains, as his son-in-law Lockhart has observed, "the first hints of an endless variety of incidents expanded and emblazoned by his mature art." A 3d volume, consisting chiefly of original ballads by himself and others, was published in the ensuing year; and the whole work gained the author a considerable reputation in literary circles, which was enhanced by his annotated edition of the ancient poem of "Sir Tristrem" (1804). These works were but preliminary to "The Lay of the Last Minstrel" (1805), a romantic poem of border chivalry, of which the first draught had been written in the autumn of 1802. To a public whose conceptions of metrical romances had been derived from the obscure and interminable narratives of the old minstrels, its lively pictures of feudal border life had the charm of novelty as well as of poetic merit, and the poem was received with an enthusiasm which justified the commendations of Jeffrey and others who had perused the manuscript previous to its publication. Scott was at once enrolled among the foremost poets of the age, and his appointment in 1806, through the interest of the Buccleuch and Melville families, to one of the principal clerkships in the Scottish court of session, with a salary of £800 (subsequently increased to £1,300), enabled him, by giving up his profession, to accomplish his long-cherished desire of devoting himself exclusively to literature. Entering upon his new career with an industry which never flagged, he produced in 1806 a collection of "Ballads and Lyrical Pieces," and edited a complete edition of the works of Dryden, with a life of the poet, published in 1808. In the same year appeared "Marmion, a Tale of Flodden Field," which he characterized as "containing the best and the worst poetry he had ever written," and which was followed in 1810 by "The Lady of the Lake," the most refined and matured of all his longer poems, although containing nothing so spirited perhaps as the battle in "Marmion," or so picturesque as some of the scattered sketches in the "Lay of the Last Minstrel." His next poem, "The Vision

of *Don Roderick*" (1811), was in a much weaker vein; and "*Rokely*" (1812), a tale of the English civil wars, though relieved by passages of great beauty, but feebly reflected the romantic fervor of his earlier poems. Feeling that his *prestige* was shaken, he returned in "*The Lord of the Isles*" (1816) to the more familiar scenery and history of Scotland, but failed, even with the aid of the Bruce's name and the picturesque incidents of Bannockburn, to redeem his laurels. His remaining poems, "*The Bridal of Triermain*," published anonymously in 1813, "*The Field of Waterloo*" (1815), and "*Harold the Dauntless*" (1817), are in most respects unworthy of him. Before the appearance of the last named works, however, he had become aware that his hold upon the public attention had relaxed, and the rising popularity of Byron warned him to seek literary fame in other paths than those he had recently trod. In the summer of 1814 accident threw in his way some mislaid sheets of a novel destined to illustrate highland scenery and customs in the era of 1745, which had been commenced in 1805, but laid aside in consequence of the unfavorable opinion of a literary friend, and from an unwillingness to endanger his poetical reputation by attempting a new style of composition. The 2d and 3d volumes were written according to the original design in the short space of 3 weeks, and in July of the same year the work was given to the world anonymously under the title of "*Waverley*, or 'tis Sixty Years Since." His motive in withholding his name, as he tells us in the autobiographical introduction to the revised edition of his works, "was the consciousness that it was an experiment on the public taste, which might very probably fail, and therefore there was no occasion to take on himself the personal risk of discomfiture." The "experiment" succeeded beyond the author's utmost expectations, and the publication of "*Waverley*," marking an era in the history of English fictitious literature, revealed to him a field of intellectual labor in which he might surpass his previous efforts. The motive for embarking upon the splendid career now opening before him was altogether peculiar, and must be traced to Scott's personal character, and the influence of his favorite studies. Of naturally aristocratic predilections, which had been fostered by the chivalric atmosphere in which his imagination had found its fullest exercise, proud of his ancient lineage, and unwavering in his local attachments, it was one of the objects of his life to be numbered among the landed gentry of the old border country from which his family had sprung. Previously to 1811 he had been in the habit of passing his summers at Ashestiel on the Tweed, near Selkirk, an estate belonging to a kinsman. A portion of his literary gains was in that year devoted to the purchase of a small farm on the same river, within a few miles of Melrose, to which he gave the name of Abbotsford, and which by successive purchases, often made at ex-

orbitant prices, gradually expanded into a large domain. In like manner the modest dwelling first erected upon it grew in the course of a few years into a Gothic castellated mansion of considerable size; and it was the owner's chief occupation, in the intervals of literary labor or of hospitable duties, to add to the embellishments of both house and grounds, until the whole became that baronial manor which his fancy had pictured to him, and which still constitutes one of the most famous literary shrines of Scotland. Literary fame was less dear to him than the revival of the name and influence of his family among the scenes of their feudal exploits; and it has been averred on the authority of those who knew him most intimately that, at 40 years of age, "it was the principal spring of his actions to add as much as possible to the little realm of Abbotsford, in order that he might take his place—not among the great literary names which posterity is to revere, but among the country gentlemen of Roxburghshire!" Under the influence of this passion he produced in rapid succession the novels now associated with his name; and it was perhaps his unwillingness to impair his standing as a landed proprietor by allowing it to be known that he was an author writing for fortune, that prompted him to preserve his incognito until concealment was no longer possible. To "*Waverley*" succeeded in 1815 "*Guy Mannering*," and in 1816 "*The Antiquary*," both "by the author of *Waverley*." His next tales, "*The Black Dwarf*" and "*Old Mortality*" (1816), constituted the 1st series of the so called "*Tales of my Landlord*," while "*Rob Roy*" (1817) was "by the author of *Waverley*." In the succeeding year appeared "*The Heart of Mid Lothian*," and in 1819 "*The Bride of Lammermoor*" and "*A Legend of Montrose*," forming additional series of "*Tales of my Landlord*." "*Ivanhoe*" (1819), which was to have appeared under a new incognito, was, in consequence of the publication of a novel in London pretending to be a 4th series of "*Tales of my Landlord*," announced as "by the author of *Waverley*." During the next few years he produced "*The Monastery*" and "*The Abbot*" (1820); "*Kenilworth*" and "*The Pirate*" (1821); "*The Fortunes of Nigel*" (1822); "*Peveril of the Peak*," "*Quentin Durward*," and "*St. Ronan's Well*" (1823); "*Redgauntlet*" (1824); and "*Tales of the Crusaders*," comprising "*The Betrothed*" and "*The Talisman*" (1825), all "by the author of *Waverley*." Down to the end of 1825 he was engaged in a variety of miscellaneous enterprises beside those specified. In 1809 he edited the "*State Papers and Letters of Sir Ralph Sadler*," in 1809-'12 "*Lord Somers's Collection of Tracts*" (13 vols. 4to.), and in 1814 the works of Swift in 19 volumes, with a life of the author. An excursion to the continent after the battle of Waterloo furnished the materials for "*Paul's Letters to his Kinsfolk*;" and he was also an occasional contributor to the

"Edinburgh" and "Quarterly" reviews and other periodicals, including the "Edinburgh Annual Register," the historical department of which he conducted in 1814-'15; and was connected with the publication of several works on the history and antiquities of Scotland. To these must be added his dramatic sketches, "Halidon Hill" (1822) and "Macduff's Cross," and the articles on "Chivalry," "Romance," and the "Drama," for the "Encyclopædia Britannica." With the increase of his prosperity he kept state at Abbotsford like a wealthy country gentleman, delighting apparently in dispensing those gracious acts of hospitality which accorded so well with his notions of the duties of his station; and during the portion of the year, from March to December, in which he resided at Abbotsford, his house was the resort of innumerable visitors of every rank and degree, whom he received with a cheerful *bonhomie* and unstudied simplicity of manner, which made him one of the most delightful of companions. His mornings until 11 o'clock were devoted to composition, and the rest of the day to the superintendence of the works of improvement on his grounds, or the entertainment of his guests and family; and in spite of his lameness he was an indefatigable walker and rider. His winters were passed at his house in Edinburgh. His literary fame, greatly enhanced by the steadily growing belief that he was identical with the author of "Waverley," seems never to have disturbed his equanimity; and the baronetcy conferred upon him by George IV. in 1820 was probably received with more satisfaction than the praises of the public. That he was, however, not exempt from the misfortunes which seem almost hereditary in his profession, was presently proved by an event which, while it overwhelmed him in financial ruin, materially affected the character of his subsequent literary productions, and brought his life prematurely to a close. In Jan. 1826, Constable and co. of Edinburgh, his publishers, were obliged, in consequence of the commercial crisis of that year, to suspend payment, and Scott was found to have incurred liabilities to their creditors to the amount of no less than £72,000. In his eagerness to enlarge and embellish Abbotsford, and for the purpose of maintaining there a style suitable to the estate, he had been in the habit of receiving from Constable and co. large sums in anticipation of works in progress, or which he designed to write, and was thus led, on the principle of mutual accommodation, to give the firm counter acceptances or to indorse their notes, as a means of relieving them from embarrassments, of which he was himself partly the cause. This disaster was almost immediately followed by the failure of the printing house of James Ballantyne and co., which had printed Scott's works since the year 1802, and of which, to the surprise of his friends, it was now discovered he had been a secret partner since 1805. (See BALLANTYNE.) The affairs

of both firms had become involved with each other to an extent little creditable to the sagacity or business capacity of the parties concerned; and Scott was found to be liable, as partner of Ballantyne and co., for the total amount of the debts of the firm, which somewhat exceeded £100,000. As about half of the £72,000 due to the creditors of Constable and co. was included in the debts of Ballantyne and co., his actual liabilities on account of both firms amounted to a little less than £150,000. Unappalled by the magnitude of his misfortunes, not the least of which must have been the mortification attending the exposure of his secret connection with the printing house, he refused the composition which his creditors offered him, and, having procured an extension of time, at the age of 55 heroically set about what might well have seemed the hopeless task of reimbursing them by his literary labors. He surrendered his town house and most of his available assets, but still clung to Abbotsford, although obliged to live there in a humbler style than had been his usage; choosing rather to shorten his life by toil than part with what he fondly hoped might be the ancestral home of his descendants. In 1826 appeared "Woodstock," a novel written during the crisis of his financial troubles, and followed by "Chronicles of the Canongate, First Series," and the "Life of Napoleon Bonaparte" (1827), the latter of which is understood to have produced him £18,000. At a dinner given for the benefit of the Edinburgh theatrical fund on Feb. 23, 1827, he finally threw off the mantle of disguise, which he observed to a friend had become somewhat tattered, and declared himself to be the sole author of what were known as the "Waverley novels," a fact long previously established to the public satisfaction. His remaining works are the "Chronicles of the Canongate, Second Series" (1828); "Tales of a Grandfather, First, Second, and Third Series" (1827-'29), devoted to Scottish history; "Anne of Geierstein" (1829); "The Doom of Devoirgoil" and "The Auchindrane Tragedy" (1830); a "History of Scotland" (1829-'30), forming 2 vols. of Lardner's "Cabinet Cyclopædia"; "Letters on Demonology and Witchcraft" (1830), published in Murray's "Family Library"; another series of "Tales of a Grandfather" (1830), on French history; and a 4th series of "Tales of my Landlord" (1831), containing "Count Robert of Paris" and "Castle Dangerous." He also furnished the notes and prefaces for a cheap uniform series of the Waverley novels, commenced in 1829 by Robert Cadell, who had purchased half of the copyright; and the profits of the new edition added very considerably toward the liquidation of his debts. Labors so onerous as these were beyond the powers of almost any author, and Scott in his later works began to give evidence of mental exhaustion, which the public, sympathizing with his misfortunes and anxious to contribute toward his liberation from debt,

generously overlooked. Not only was his brain overtasked, but his bodily health, previously good, declined under the influence of incessant mental application and confinement; and in the winter of 1830-'31 symptoms of gradual paralysis, a disease hereditary in his family, began to be manifested. To avert the impending blow, abstinence from literary labor was enjoined upon him, and, in Oct. 1831, he sailed for Italy in a ship furnished by the admiralty. Honors seldom paid to literary men awaited him at Naples, Rome, and elsewhere; and in the last named city he showed the peculiar bent of his tastes and instincts by regarding the remains of Gothic mediæval splendor with a keener interest than those of the older Roman civilization. Feeling that his strength was rapidly failing, he requested to be conveyed at once to his native country, that he might die within sight and sound of the Tweed. The journey was accomplished too rapidly for his strength, and upon his arrival in London in June, 1832, he had become insensible to the presence of his most intimate friends and relatives. He reached Abbotsford on July 11, seeming to revive a little in the presence of familiar scenes and faces, but soon after relapsed into insensibility, in which condition, after occasional intervals of consciousness, death finally overtook him. He was buried in an aisle in Dryburgh abbey, which had belonged to one of his ancestors, and his memory is perpetuated by a noble Gothic tabernacle erected in Edinburgh in 1844-'5. By dint of extraordinary exertions he had paid at the time of his death upward of £100,000 of his debts, and soon afterward, chiefly through the liberal advances of Cadell, who received in return Scott's share of the profits accruing from copyright property in the Waverley novels, the claims of all his creditors were fully satisfied—a result perhaps never achieved before or since within so brief a space of time by the intellectual efforts of a single person. His 4 children, 2 sons and 2 daughters, survived him, but have since died, leaving no male issue to continue the family name. His eldest daughter was married to J. G. Lockhart, and their daughter, the present owner of Abbotsford, has, with her husband, Robert Hope, assumed by act of parliament the name of Scott.—In personal appearance Scott was tall and of vigorous frame, and in walking betrayed his lameness only by a slight sinking of the right limb. His head was long and cylindrical in shape, his complexion fair, and his eyes, surmounted by large bushy eyebrows, small and gray. The expression of his countenance was somewhat heavy, but in conversation or in moments of relaxation it lightened up with great animation. Of his generosity, his affability, his passion for field sports and love of dogs and horses, and the innumerable little traits which endeared him to the domestic circle, as well also as of his strong prejudices, particularly on political subjects (his opinions being, as may be sup-

posed from the sentiment pervading his writings, strongly tory), many interesting details may be found in the elaborate biography by his son-in-law Lockhart, which is the only complete record of his life. To judge from the number and variety of the editions of his novels recently published in Great Britain and America, his popularity, notwithstanding the rise of many distinguished names since his death, is undiminished. The historical novel, considered as a separate department of fiction, may be said to have been created by him; and, after making due allowance for the exaggerated respect with which he viewed mediævalism, and his erroneous views of the character of those Gothic ages in which his fancy delighted to roam, he is entitled to the credit of having communicated a historical tendency to imaginative literature which has not yet exhausted itself, and which has led to important results in other fields of literary labor.

SCOTT, WINFIELD, an American general, born in Petersburg, Va., of parentage of Scotch descent, June 13, 1786. He was left an orphan in his boyhood, was educated at William and Mary college, and studied law. After a few years' practice of that profession, he was appointed in 1808 a captain of the light artillery, and was stationed at Baton Rouge, La., in the division commanded by Gen. Wilkinson. Some remarks uttered by him expressive of an opinion of Gen. Wilkinson's complicity with Burr's conspiracy were made the ground of a prosecution, and led to his suspension from duty on the score of disrespect to his commanding officer. Capt. Scott returned to his native state, and turned to advantage his year's absence from duty by laboriously studying his profession. In July, 1812, he was advanced to the rank of lieutenant-colonel, and ordered to the Canada frontier. Arriving at Lewiston while the affair of Queenstown heights was in progress, he crossed the river, and taking part at once in the battle, the field was won under his direction; but it was finally lost and himself and his command taken prisoners, from the refusal of the troops at Lewiston to cross to their assistance. The war of 1812 had arisen in part out of the claim of the British government to the right of impressing seamen into her service, Great Britain acting on the maxim: "Once a subject, always a subject," while the American government insisted upon the right of expatriation. The British officers attempted to enforce practically the doctrine of their government in the case of the prisoners taken at Queenstown, and were in the act of selecting the Irish and other foreign-born citizens out of Col. Scott's command, to send them to England to be tried for treason, when he ordered the men not to answer any question or make known the place of their nativity. He threatened the retaliation of his government, and, upon being exchanged, procured the passage of a law to that effect; and he caused a number of British prisoners equal to that of his

own men who had been sent to Europe to be set aside for the same fate that those should receive. The result was the safe return of his men to the United States after the close of the war. Shortly after the capture of York, Upper Canada, where fell the gallant Gen. Pike, Scott joined the army under Gen. Dearborn, as his adjutant-general with the rank of colonel. In the combined naval and land attack upon Fort George, May 27, 1813, he was in command of the advance in surf boats. The landing was effected in the face of a heavy fire of musketry, and the line was formed on the beach, below an abrupt elevation of 10 or 12 feet held by 1,500 of the enemy. Scott was hurled backward from the ascent, but rallying carried the position, and pushed on to Fort George, which the enemy abandoned after putting slow matches to the magazines. One of these exploding, the colonel was struck from his saddle by a flying piece of timber and severely hurt. Two officers snatched away in time the matches from the other two magazines, and Col. Scott with his own hands pulled down the British flag. Commodore Chauncey, Lieut. O. H. Perry, and Generals Winder and Alexander Macomb were in the expedition. In the autumn of 1813 Col. Scott commanded in the advance of Wilkinson's descent of the St. Lawrence—an operation directed against Montreal, but which was abandoned on wholly insufficient grounds, at a time when the place could have been easily captured and the campaign closed with honor. In the spring of 1814 Scott was made a brigadier-general, and established a camp of instruction at Buffalo, where he introduced the French system of tactics, and rigorously put them in practice from April to July, with such success that the three brigades and the battalion of artillery under him were as thoroughly instructed as is requisite for all the purposes of war. The effect was soon seen and felt in the operations that followed. On July 3, 1814, Scott's and Ripley's brigades, with Hindman's artillery, crossed the Niagara river, took Fort Erie and a part of its garrison, and the next day advanced upon Chippewa, skirmishing the whole distance to the position held by Riall, the British general; and on the 5th was fought the battle of Chippewa, resulting in the defeat and repulse of the enemy beyond the river of that name. (See CHIPPEWA.) Few battles have occurred in which the advantages at the outset were more nearly balanced, and the superiority in the end more clearly evinced. It was gained by a skilful adoption of a double oblique order of battle, the timely co-action of the two arms, infantry and artillery, and an actual shock of the bayonet. Twenty days after the battle of Chippewa was fought that of Lundy's Lane, or Bridgewater, in the immediate vicinity of Niagara Falls, in which Scott had two horses killed under him, and was twice severely wounded. (See LUNDY'S LANE.) These two engagements of Chippewa and Lundy's Lane, fought within a month by

the same American army, against the very best British troops, on their own soil, established the *prestige* of our arms, and were of lasting and inestimable value to the character of the country. Scott's wound of the left shoulder was critical, and his recovery painful and slow, and when completed his arm was left partially disabled. Before operations were resumed on the Canada frontier, the treaty of peace was concluded. Scott was offered and declined a seat in the cabinet as secretary of war, and was promoted to be major-general. He assisted in the reduction of the army to a peace establishment, and then visited Europe in a military and diplomatic capacity. Arriving in France shortly after the battle of Waterloo, the American general enjoyed the rare satisfaction and advantage of consultation and discourse with some of the leading captains that had been formed under the hand of Napoleon. After the peace of 1815 Gen. Scott made several contributions to the very slender military literature of the country. His "General Regulations for the Army" (1825) supplied at the time a great *desideratum*, and contain much useful information for the field and garrison. The "Infantry Tactics," taken from the French, and published under a resolution of congress in 1835, is the basis of that department of military knowledge in this country. Beside these, their author materially aided in the preparation of other works of a similar kind, and employed his pen in different departments of letters. The first event of much public importance in the life of Gen. Scott, between the war of 1812 and the Mexican war of 1846-'48, is the hostilities of 1832 against the Sacs and Foxes, which were terminated by the battle of Bad Axe. The head chief, Black Hawk, was shortly after made prisoner. In the mean time Gen. Scott was on his way to the scene of hostilities by the route of the great lakes, to guard against the contingency of a league of the other north-western tribes with Black Hawk's band. On the passage of the troops to Chicago the cholera broke out with fatal severity among them, and for the time prostrated the command. After landing the detachment at suitable points and making every provision for their welfare, Gen. Scott arrived on the Mississippi river, where he again encountered the same dreadful scourge in the army under Gen. Atkinson. In the same year occurred the nullification troubles in South Carolina, threatening a collision between the authorities of that state and of the United States. Great prudence, much discretion, tact, self-restraint, and delicacy were called for on the part of the chief military man commanding at that crisis the forces of the general government in the harbor of Charleston. Boldness, decision, energy, so valuable in their effect at other times, might then have precipitated a result fatal to the peace of the country. The qualities actually required by the occasion were conspicuously displayed by Winfield Scott. The cloud passed



away for the time. The war with the Seminole Indians in Florida began in 1835. No other part of the territory of the Union is so difficult for the operation of troops, or so favorable for the flight, ambushes, and stratagems of a savage enemy. The war lingered till 1842, and was finally terminated by subsidizing the chiefs and influential men, and conniving at the continuance of a part of the Indians in the country. In the winter of 1837-'8 there were 10,000 troops in the peninsula, under Gen. Jesup, who had displaced Gen. Scott, but no decided results were obtained. Gen. Scott was but a short time in the territory before he was called to the Creek country, and thence was ordered before a court of inquiry to answer for the failure of the campaigns in Florida and the Creek country. The finding of the court was without qualification in his favor, and it was confirmed by intelligent public opinion. The troubles in the Cherokee country in 1838 sprang from the same cause as those in Florida—the policy of removing the Indian tribes beyond the Mississippi river, and obstacles and resistance to that policy of the United States government. A conflict of jurisdiction had arisen between the laws of the state of Georgia, within whose boundaries a large portion of the Cherokee bands lay, and the tribal customs and regulations. The general government could not assure to the Indians the rights it wished to guarantee to them while they continued within the states. Their removal was consequently a necessity, and it proved to be a benefit to them, and a bettering of their condition in all respects. At the time, they felt it as a severe grievance, and yielded to the requirements of the government and of the military commander, Gen. Scott, only with great reluctance. The personal and official influence of the general was exerted with extreme mildness and consideration mingled with firmness, and was entirely and happily successful. The whole body of these people, semi-civilized and many educated, took up their line of march for the west, and settled in their new homes on the Arkansas, where they have continued to increase in numbers and to advance in the arts of peace.—The Canadian rebellion, which was an armed rising, in Lower Canada, against the British government, spread over the border, enlisting numerous sympathizers in the United States, and developed into the "patriot war of 1837." It continued to be a source of excitement and danger on the American side of the line, after it had ceased on the other side. What was at first sympathy with the Canadian grievances soon awakened the old slumbering animosity against Great Britain and the memories of 1812. Scott was called to exert his best energies to prevent the outbreak of a needless and defenceless collision and conflict, in violation of treaties and in defiance of international law. The labors exacted of him were most severe; the exposure along that ex-

tended frontier line of frozen lakes and rivers winter after winter, flying from point to point a thousand miles apart, was what few constitutions could have withstood. The burning of the *Caroline* was an occurrence sufficient in itself, leaving out of view the wild excitement of the times, to have caused a war between the United States and Great Britain. Not unconnected with the hostile feeling against England that kept the frontier of Canada in a ferment, was the dispute about the boundary line of Maine and New Brunswick. Actual hostilities were impending between the state and the province, and intercourse between the governor of the one and the lieutenant-governor of the other had for some time wholly ceased, when Gen. Scott arrived at Portland, Me., in the spring of 1839. He appeared in the character of a pacificator, and found in the person of Maj. Gen. Sir John Harvey, the lieutenant-governor of New Brunswick, an old and warm military friend, between whom and himself several interchanges of services and kindnesses had passed during the war of 1812. Through this friendship, and by means of the confidence and esteem it had produced, Gen. Scott was enabled to reopen communications between Gov. Fairfield and Sir John Harvey, to establish a temporary convention between the state and the province that prevented the disputed territory from becoming the scene of hostilities, and referred the whole question to Washington, where it was finally settled by the treaty arranged in 1842 between Mr. Webster and Lord Ashburton. Gen. Scott had meantime, by the death of Gen. Macomb in 1841, become commander-in-chief of the army of the United States.—The annexation of Texas having resulted in war with Mexico, on May 8 and 9, 1846, were fought between the Nueces river and the Rio Grande the battles of Palo Alto and of Resaca de la Palma; Monterey was stormed in the September following, and the battle of Buena Vista won in February of the next year, all under the leadership of Gen. Zachary Taylor. After the taking of Monterey it was seen that to "conquer a peace" an impression must be made upon the interior of the republic of Mexico, and that another line than that of the Sierra Madre must be followed. Gen. Scott was assigned to the chief command of the army in Mexico. The plan was to make Vera Cruz the base line, and to direct an army upon the capital of the country. To make up the necessary force Scott drew a portion of the troops from Taylor, leaving him however quite sufficient to hold his own line, but not to advance, as Gen. Taylor's own correspondence states. Scott assembled his army of invasion at Lobos island, north of Vera Cruz, leaving Santa Anna, who was then in force at San Luis Potosi, in doubt as to the point of attack, whether he would enter the country by way of Tampico or Vera Cruz. Finally, on March 9, 1847, the 12,000 men were thrown ashore at Vera Cruz without the

smallest casualty, and the city was at once invested from shore to shore. The mortar battery opened on the 23d, the siege pieces on the 24th, and, after receiving nearly 7,000 missiles fired day and night, the city and the castle of San Juan d'Ulloa capitulated on the 26th, and their garrison of 5,000 on the 29th marched out of the city and grounded their arms. The march toward Jalapa was begun on April 8, and on the 17th the army was in front and on the flank of the mountain position of Cerro Gordo. The defile formed by the river Plan del Rio is of incalculable natural strength. It was now fortified and defended by Gen. Santa Anna with an army of double the numerical strength of the American. Scott's prophetic order begins: "The enemy's whole line of intrenchments and batteries will be attacked in front, and at the same time turned, early in the day to-morrow, probably before 10 o'clock A. M." The order that directed what was to be done, became after it was done the narrative of the performance. In this battle the three arms, artillery (field and siege), infantry, and cavalry, were combined against the narrowness of defiles, the command of elevations, fortified positions, and duplicate numerical force. (See CERRO GORDO.) The enemy driven from every point of his line, the American army followed in pursuit, capturing Jalapa April 19, Perote on the 22d, and Puebla May 15. Here it remained, drilling and waiting for reinforcements, till Aug. 7. Scott had opposed the indecisive policy of occupying an armed frontier line, either the Rio Grande or the Sierra Madre, pronouncing that this would lead to "a war like a peace." It was he who had designated the base line of Vera Cruz and the line of operations thence to the city of Mexico. For the preparatory measure of the campaign, whatever its plan should be, Scott, as the commanding general of the army, at Washington, had proposed to the administration that the new troops to be raised should be assembled at convenient and healthful positions within the United States, there to be organized, instructed, and disciplined, while measures were also taken to collect and arrange the necessary *matériel*. He ventured the suggestion that the new line could not be placed upon the Rio Grande earlier than September. The proposal was ridiculed and rejected. Time vindicated it with exactness. The army was delayed at Puebla to do there what should have been done at home beforehand. The sickness and losses upon both Taylor's and Scott's lines were excessively increased by the unfitted state of the new troops for the field. Santa Anna had time to create a new army and to fortify the capital. Up to the time of Scott's arrival in Mexico there was no law to punish offences committed by Americans upon Mexicans and by Mexicans upon Americans. Congress had adjourned without providing any remedy. The most flagrant crimes had passed unpunished; they were increasing, and barbarities untold were continually occurring. The

discipline of the army was seriously endangered; a state of things similar to that under Junot in Spain was fast approaching, and the libertinage of assassination would at no distant period have inaugurated a guerilla system which that mountainous country would have favored in a high degree. To meet and to correct this condition, the general in February, at Tampico, published his "General Order No. 20," which specified the classes of crimes and offences hitherto unprovided for, deduced a code of laws from the articles of war and the general criminal jurisprudence of the United States, and established tribunals under the name of military commissions. From the 7th to the 10th of August the divisions were set in motion from Puebla upon the national road, the whole force numbering 10,748 men. The advance of the army came in view of Mexico on the 10th. The city, lying in a great basin, was at a former period entirely surrounded by water, and reached by causeways. It is still dotted around by lakes, with marshes interposed, and still approachable by causeways. The road from Puebla enters the city at the east, passing between the lakes Tezcuco on the north and Chalco on the west. This road was defended by a fortified mound, El Peñon, which could have been taken only at very great loss. After approaching and reconnoitring El Peñon, it was decided not to attack it. For sufficient reasons the route by Mexicalcingo also was declined. An examination was ordered by Gen. Scott through Gen. Worth, whose division was at the E. end of Lake Chalco, to ascertain whether a possibly practicable route could be found or made around that lake and the adjoining lake Xachimilco. A difficult way was found to exist. The *détour* was made around the lakes to the southern avenue of the city, the Acapulco road. The last division of the army (Twigg's) withdrew from before El Peñon on the 16th, up to which time even they believed that the attack on Peñon was intended. The *détour* was a stroke of strategy which had long been premeditated as a likelihood by the general, and as such imparted to his staff. The American army was now directly south of the city, at San Augustin, but the road was defended by the fortified village of San Antonio, and nearer the city by the convent, church, and *tête de pont* of Churubusco. San Antonio was flanked by lava fields (*pedregal*), most difficult of passage. Westward those fields stretched to the intrenched camp of Contreras, some 5 miles, held by 7,000 picked troops under Gen. Valencia, with a reserve of 12,000 under Santa Anna near San Angel. It was determined to leave Worth's division on the Acapulco road observing San Antonio, and to attack Contreras. That position and Churubusco were successively carried on Aug. 20 (see CHURUBUSCO), and the army could have taken the capital, but it was deemed better to afford an opportunity for negotiations, through the peace commissioner Mr. Trist, who was present for that purpose. A

truce was asked by Santa Anna on the 21st, an armistice entered into, and negotiations carried on till Sept. 7. The armistice at an end, another series of operations began, on the S. W. avenue of the city, the Toluca road. The headquarters had been established at Tacubaya, to the N. of which and commanding the road was Chapultepec, a strongly fortified and wooded eminence, the seat of the Mexican military college. At its foot the Toluca road branches toward the city, the right causeway leading to the Belen gate, and the left going N., then turning E., and entering the city on its W. side by the gate of San Cosme. West of Chapultepec itself an extended line formed by the Molino del Rey and Casa Mata, massive stone buildings within range of Chapultepec, was held by a body of Mexican troops, numbering, as it afterward proved, about 14,000. On Sept. 8 Gen. Worth with 8,500 men was ordered to take these stone buildings, destroy the cannon foundry which was reported to be there, and the defences, and afterward return to the main army. The first attack cannot be said to have been repulsed, but its success was partial. All three of the arms were actively employed, and at length the success was complete. More than 800 prisoners were taken, the *matériel* was captured, and the buildings destroyed. In this brief fight nearly a fourth of Worth's command fell, and of these 58 were officers. After thoroughly reconnoitring all the routes into the city, it was decided not to leave Chapultepec on the army's flank or in its rear, but to assault it, and then, seizing the two lines of causeway that divide at its base, to direct the columns upon the *garitas* of Belen and San Cosme. The fortifications were battered by the siege pieces on the 12th, and on the 13th, these uniting and timing with Gen. Pillow's attack through the wooded west side and Gen. Quitman's on that of Tacubaya, this strong place was carried in a style of the highest gallantry. (See CHAPULTEPEC.) Meantime Worth had gained the rear, and was between the hill and the city, in pursuit of the enemy northerly on the aqueduct and causeway that reach the gate of San Cosme. Quitman seized the route to the Belen gate. Twiggs's division, with the brigade of Riley and two field batteries, had been held on the Aca-pulco road to manœuvre toward that entrance as a feint. Quitman's advance likewise was intended to be a feint, and Worth's the real attack. However, Quitman found himself opposed by pieces in position, which he carried, and pressed on to the Belen gate, took it, and there remained for the night, within the city, Worth in the same way holding the gate of San Cosme. On the morning of Sept. 14 the army passed into the city, Quitman's division leading into the Grand Plaza, and running up the United States flag on the national palace. Gen. Scott rode into the square at 9 A. M., amid the greatest enthusiasm. Mexico was conquered. Its 32,000 soldiers had disappeared, and its lines of fortifications were silent and

abandoned. There was some street fighting and firing upon the troops from the buildings, on the part of disbanded soldiers, released criminals, and the *leperos* (street beggars); but this disgraceful conduct was, after some loss, suppressed during the day. Order was established and extended, and a contribution levied on the city of \$150,000 for the army, two thirds of which sum Gen. Scott remitted to the United States to found military asylums. Taxes to raise revenue for the support of the troops were laid, the sphere of the military commission was extended and defined, and in fact a civil organization was created under the protection of the troops, which were spread over various parts of the country to give it an order and a security which it had long ceased to enjoy; all which made the presence of the American army in Mexico not the scourge that invading and victorious forces generally are, but acceptable and a blessing to the people of the country, whose best citizens saw its withdrawal approaching with regret. The treaty of Guadalupe Hidalgo, negotiated by Mr. Trist, was signed on March 2, 1848, and Mexico was soon after evacuated by the American armies. A court of inquiry was called, but the result only redounded to the fame of Gen. Scott.—In 1852 he was the unsuccessful nominee of the whig party for the presidency, receiving 1,386,580 votes, to 1,601,274 for the democratic candidate, Gen. Pierce. In 1855 the brevet rank of lieutenant-general was revived in order that it might be conferred upon Gen. Scott, and was expressly so framed that it should not survive him. In 1859, serious differences as to the boundary line of the United States and British America through the straits of Fuca having arisen, and a disputed military possession occurring, Gen. Scott was ordered to that distant locality, where he happily established a satisfactory state of affairs, and settled the difficulty. In the civil war now (1861) in progress, Gen. Scott has thrown unhesitatingly the weight of his great and solid reputation on the side of the Union and the government. In President Buchanan's term the commanding general urged the wisest precautions to prevent the armed withdrawal of the 11 seceded states from the Union. He secured the safe inauguration of President Lincoln, the defence of the national capital, the organization of the army of the Union, and its establishment upon the strategic points of the country. At his advanced age he has exerted an astonishing energy in the effort to hold together the interests, the affections, and the doctrines of the republic. On Nov. 1, 1861, the lieutenant-general retired from active service, retaining, by a special provision in the act of congress passed at its extra session in the summer of 1861, his full pay and allowances, and on Nov. 9 sailed from New York for Europe, hoping there to recover his broken health.

SCOTUS, DUNS. See DUNS SCOTUS

SCOTUS, JOHN. See ERIGENA.

**SCOUGAL, HENRY**, a Scottish clergyman and author, born at Saltoun, East Lothian, in June, 1650, died in Aberdeen, June 13, 1678. He was the son of Patrick Scougal, bishop of Aberdeen and chancellor of the university, where he was educated. In 1669, in his 20th year, he became professor of philosophy there, and in 1674 professor of divinity. His chief work is "The Life of God in the Soul of Man, or the Nature and Excellency of the Christian Religion," edited by Bishop Burnet (1677), which continues to be reprinted, with his sermons and essays.

**SCRANTON**, formerly Lackawanna, a post borough of Luzerne co., Penn., situated on the left bank of the Lackawanna river, 14 m. S. W. from Carbondale; pop. in 1853, 3,000; in 1860, 9,223. It is in the most northern of the anthracite basins, and carries on an immense business in mining and shipping coal. Several wealthy companies, principally composed of New York capitalists, are engaged in this, and in the manufacture of railroad iron, pig metal, &c. The Delaware, Lackawanna, and western railroad, the Delaware and Hudson canal company, and the Pennsylvania coal company, all export largely from this place. The aggregate amount of coal shipped by these companies for the financial year 1860, from Scranton and the neighboring villages of Hyde Park, Providence, and Dunmore, was 1,385,035 tons, the principal part of which was sent to New York. Scranton contains a rolling mill which manufactures 25,000 tons of railroad iron per annum, 4 iron furnaces, 3 foundries, 2 machine shops, 2 flouring mills, 2 saw mills, 2 banking offices, 2 breweries, 1 newspaper office, a public library and lyceum, 11 public schools attended by 1,275 pupils, and 12 churches, viz.: 2 Baptist, 1 Congregational, 1 Episcopal, 1 Lutheran, 3 Methodist, 2 Presbyterian, and 2 Roman Catholic. The Lackawanna coal and iron company alone employ 1,200 hands. Iron ore is found in the neighborhood in great abundance. The Delaware, Lackawanna, and western railroad connects this place with Great Bend on the Erie railroad, and with New York via Easton, Penn.; and the Lackawanna and Bloomsburg railroad connects with the Catawissa railroad at Rupert. The Delaware and Hudson canal and Pennsylvania coal company's railroad also afford facilities for reaching New York. (See **ANTHRACITE**.)

**SCREAMER**, the name of a group of South American wading birds, of the sub-family *palaemedinae*, and so named from the loudness and shrillness of the voice. The bill is short, elevated, and curved like that of a gallinaceous bird; nostrils large and exposed; wings long, with the shoulder armed with 2 or 3 strong spurs; tail moderate and rounded; tarsi long, strong, with numerous small scales; toes long, the anterior united by a short membrane, and the claws long and curved.—In the genus *pala-medea* (Linn.), the 3d and 4th quills are the longest, and the forehead is ornamented by a

slender cylindrical horn; the lores are feathered. The horned screamer (*P. cornuta*, Linn.), or *kamichi*, is larger than a goose, about 3½ feet long, of a blackish color with a red spot on each shoulder, and lower parts from the breast white; the bill is black and 2½ inches long, the horn 3 inches and movable in all directions, and the largest spur 1½ inches. They live generally in pairs in the inundated districts of Brazil and Guiana, especially near the sea; they are shy and timid, and have a very piercing voice, uttered at the slightest alarm; they occasionally perch on trees; the food consists of aquatic seeds and plants, and perhaps of reptiles. Though powerful and well armed on the wings, they do not attack other birds, but the males fight during the breeding season; they are strictly monogamous. The nest is made on or near the ground, in the form of an oven; the eggs are 2, as large as those of a goose, and the young are abroad by January or February, and are cared for by the mother till they are able to fly; the flesh of the young, though dark, is good eating.—In the genus *chauna* (Ill.), the 3d, 4th, and 5th quills are the longest, and the lores are bare. The faithful screamer (*C. chavarria*, Ill.) is nearly 3 feet long, of a blackish lead color, with a white spot at the back of the wings and another at the base of some of the large quills; there is no horn on the head, and the occiput is adorned with a circle of erectile plumes, the other feathers of the part being downy; the collar is black. It is a native of South America as far south as Paraguay, and the food consists of aquatic plants. They are easily domesticated, and the natives of Carthage bring them up with their geese and hens, which they defend with the wing spurs even against the largest birds of prey. It possesses the singular power of inflating the skin of the body and legs with air, causing a crackling feeling to the touch. The walk is grand, and the flight vigorous; it is called *chaja* from its note. Another species (*C. Derbiana*, Gray), from Colombia, has the cheeks and throat white, and the legs and bill red; it occurs in pairs or in flocks.—This sub-family forms one of the connecting links between the waders and the gallinaceous birds, resembling the latter in form, habits, and disposition.

**SCREW**, a mechanical device variously applied to many useful purposes in the arts, and constituting one of the mechanical powers. It is constructed in two forms: one, known as the external, convex, or male screw, is a cylinder of wood or metal surrounded with either a spiral groove or ridge, which makes equal angles with lines parallel to the axis of the cylinder; the other, called the interior, concave, or female screw, is a hollow cylinder with grooves around its interior fitted to the ridges of the corresponding solid screw. When very short and used as a fastening upon the external screw, it is known as a nut. The spiral ridges are called the thread of the screw, and these are made more or less close together according

to the purposes for which the screw is designed. The principle upon which the thread of screws is laid out was well understood by the ancients, and the method is given in the works of Pappus Alexandrinus, a Greek mathematician of the 4th century of our era. A strip of thin brass in the form of a right-angled triangle is cut so that the hypotenuse representing the thread shall have the required inclination to the other sides, one of which corresponds to the line of the cylinder and the other to its circumference; and being thus applied to the blank cylinder designed for the screw by wrapping the brass around it, the line of the thread is marked along the hypotenuse, and is afterward cut in. The thread winding around and ascending the cylinder is evidently a spiral inclined plane, and possesses the properties of this power. By attaching a handle to the screw for turning it round, the power of the lever is added, and thus heavy weights opposed to the longitudinal movement of the screw may be moved or raised. On this principle are constructed the various forms of screw presses, and other such machines, the object of which is the application of great power within a limited space. The ratio between the moving power and the resistance or pressure is as the distance between two adjacent threads of the screw is to the circumference of the circle described by the point at which the power is applied. Friction is a considerable element in this application of power, being often equal to the weight of the body moved, thus preventing its descent after it is raised and the moving power taken away. The action of the screw is indefinitely extended and its power increased by adding to it a wheel and axle, so arranged that the teeth of the wheel engage in the threads of the screw and are brought round continually while the screw is made to turn in a fixed position against the wheel. In this arrangement it is known as the endless screw. To the axle of the wheel the weight to be raised is suspended, and the power is applied to a winch or to a pulley upon the screw. The ratio between the power and the resistance is then as the distance between the threads of the screw multiplied by the radius of the axle is to the length of the lever or winch multiplied by the radius of the wheel. Beside this application of the endless screw with the wheel and axle for raising heavy weights, it is extremely useful as a component part of graduating machines, and is the form used in the fine-threaded screws used for measuring minute angles, &c. (See MICROMETER.) Its special adaptation for this use depends upon the very great space through which the lever of the screw passes in comparison with that described by the cylinder in the direction of its length. The power of the screw is again greatly increased, and the measured movement of its cylinder through infinitely small spaces determined, in what is known as Hunter's screw. This consists of two screws, a smaller external

screw working in the hollow end of a larger screw, which is both external and internal. Its outer thread usually has one less turn to the inch on the length of the barrel than the smaller screw; and consequently when turned once around, the actual advance is the difference between the larger and smaller threads. If one has 20 threads and the other 21 in an inch, the outer screw with each turn goes forward  $\frac{1}{20}$  of an inch, but the smaller one enters it  $\frac{1}{21}$  of an inch, and the advance is thus only  $\frac{1}{420}$  of an inch. A screw of this kind has been made with 100 threads to the inch on the external and 101 threads on the internal screw, thus making the movement with each turn only  $\frac{1}{10100}$  of an inch; and by means of a micrometer attached to the outer screw this space was further subdivided into hundredths.—Another important application of screws is like that of nails for securing together separate pieces of wood, metal, &c. For this use the screws are made of bits of wire or larger rods of metal and furnished with heads. Those of the larger sizes are termed bolts, and to give them a hold like that of rivets they are made to pass entirely through the objects to be fastened, and a nut is put upon the projecting end and screwed round till it makes a tight fit. Bolts are common fastenings in the construction of machines and engines, and in the putting together of the heavy timbers of ships. The facility with which they may be loosened and taken out by removing the nut is often a great advantage. By battering the thread of the screw next the nut, this may be made as firm and immovable as the head of a rivet. The small screws in general use, answering instead of nails, are commonly known as wood screws, and are made of all sizes from 3 or 4 inches in length to  $\frac{1}{4}$  of an inch or less. Screws of the same character for the special uses of the watchmaker and instrument maker are of still smaller sizes. The wood screw tapers slightly from the head downward, and the thread usually occupies about  $\frac{2}{3}$  of the length from the point. The under side of the head is of a true taper, and when the screw is set in its place accurately fits the hole that has been rimmed out for it to the same taper. The upper side is flat, and is crossed by a narrow slit for the edge of the screw driver, by which it is turned round. The most approved form has the gimlet point, which allows of the screw entering into the wood without first boring a hole for its reception. The thread is a thin fillet left by removing the intervening metal to the required depth. Screws of this kind are made in great perfection in Providence, R. I., whence the demand for the United States is chiefly supplied. The peculiar processes of the manufacture and extent of the business have not been made public. Machines termed the wood screw rotary machines, invented by Messrs. Wilson and Wiley of Providence, were in operation as early as 1854, each one of which was reported to produce  $\frac{1}{2}$  times as many screws as could be

made in the same time by other machines; and the difference between them and the machines elsewhere in use consisted chiefly in the tools that cut the groove being slowly carried round while in action, with the horizontal wheel to which they are secured, instead of remaining fixed while the blank alone is made to revolve against them. The cutting tools in this machine were also employed in a series of 8 together, thus keeping them in operation 8 times as long without stopping to replace them with sharper ones.—Among the novel applications of the screw may be mentioned its use for pointing the lower end of wooden piles, which by this means are made to enter the ground by turning them around. (See PILE.) Several attempts have been made to obtain a motive power from the tendency of a body to descend the inclined plane of the screw, with the object of applying this to the running of clocks. The only successful one is described under the head of SCREW CLOCK. The application of the screw for raising water is noticed under ARCHIMEDIAN SCREW.—Several methods have been devised and put in practice for making screws. By one, now rarely used, the cylindrical lengths cut from rolled iron or iron wire were at a red heat headed in dies, and the thread was then cut by a file, its place being previously marked around the cylinder by one of several devices employed for this purpose. By the machine process in use in Birmingham, England, the first operation consists in clipping off the pieces from a coil of wire and striking up each piece at one end to form the head. The blanks thus formed are in the next operation placed one at a time in a lathe, and proper shape is given to the head and neck by cutting away the superfluous metal. Each blank is then placed by hand in a receptacle which holds it firmly, and is raised by a lever so as to present the head to a steel circular saw, which cuts in an instant the slit for the screw driver. After every half hour's work the saw requires sharpening, and for this purpose is taken out, its temper drawn, and the teeth filed, when it is rehardened and is again ready for use. The cutting of the thread, called worming, is done in a lathe, the mandrel of which at one end carries an iron box, which works upon a fixed regulating screw. This gives the required longitudinal movement to the blank which is secured to the other end of the mandrel, and is pushed by the revolution point first through the steel cutters. These are made by levers to press more or less firmly upon the blanks, and their action is to turn out a shaving of the metal, leaving a sharp thread or worm. The cutters are kept cool by the application of water. Screws of different threads require as many different regulating screws and boxes to fit them; but the cutters need not be changed. By other methods the cutters, are dies having the same thread as the required screw, and corresponding for external screws to the nut or tap, except that they are either in 2 or 4 parts, which may gradually be

brought together to close the circle while the shank of the blank is worked down in them to the size required. The cutting angles are produced by notches across the thread in each piece of the die. Each variety of screw in this method of cutting requires its own die. Screws of various sizes are cut by hand with dies, sets of which are furnished with the plate in which one of them is inserted when required for use. The plate is of iron with a receptacle in the middle into which the two parts of the die are fitted, and in which they may be brought toward each other by a set screw. Two long handles extend in opposite directions by which the plate may be worked to one side and the other upon the blank, which is held fast in a vice with the point upward. The thread is first cut as far as intended with the parts of the die somewhat open. The instrument is then taken off, and the parts are screwed up closer, and the operation is repeated till the thread is cut to the required depth. For cutting very slender screws, steel screw plates are furnished provided with a succession of holes of slightly varying size. The thread is cut in one of the larger holes and deepened as the shank is passed successively through the smaller ones. Internal screws are cut by making the corresponding external screw the cutter, first removing a considerable portion of the thread along its whole length in order to produce cutting edges and afford room for the escape of the shreds of metal removed. The tools made for this purpose are of steel and called taps. They are made slightly tapering in order to enter the hole with facility and cut the thread gradually. The upper end terminates in a square or oblong projection fitted to receive the lever for turning it. Taps for cutting threads in wood are commonly made with deep fluted sides for letting out the cuttings of the wood without obstruction.—For an account of various machines that have been invented for cutting screws, and which are too complicated to be described without the aid of drawings, reference may be made to the volume on "Manufactures" in the "Encyclopædia Metropolitana," and to the article "Screw" in Tomlinson's "Cyclopædia of Useful Arts," which contain a description of the screw engine employed in the Woolwich dockyard for cutting large screws accurately to any required pitch from one pattern. Appleton's "Dictionary of Machines, Mechanics," &c., under the same head, contains notices and figures of various patented machines connected with this manufacture, including several of Mr. J. O. Whipple, of Providence, R. I. The most complete treatise upon the processes employed in constructing the different sorts of screws is in vol. ii. of Holtzapffel's "Mechanical Manipulations."

SCREW CLOCK. The screw presents a long inclined plane in very small compass, which in several ways might be made to communicate motion to clock work, as, when weighted, rotating itself and descending the

length of the thread cut upon it; and again by being itself fixed and provided with a movable weight fitted to revolve around it. The obstacle in the way of these arrangements has been the friction of the screw, which in ordinary screw presses is sufficient to sustain the pressure or weight without turning back when the moving force is taken off. Clocks made upon the former plan have proved unsuccessful in consequence of this difficulty. On the other method of causing the weight to run down the screw, a very ingenious clock has been recently invented by Mr. James Tuerlingx of New York, and named the "American screw clock." This entirely avoids the difficulty named, and combines several novel features in an excellent timekeeper. An upright screw 10 to 20 inches long, according as the instrument is intended to run 36 hours or 8 days, and with 14 threads to the inch, is firmly fixed in the centre of a base plate, and around its foot revolves the main wheel, which is connected directly with the escapement and compensation balance wheel placed upon the same base. A hemispherical weight of 2 to 4 lbs., flat upon its upper surface, is perforated with a hole through its centre large enough for the screw to pass freely through without touching. This weight is suspended on the thread of the screw by means of a thin wheel fixed upon an inclined axle upon the upper flat surface. Upon this axle hangs the weight, the lower edge of the wheel running round upon the fillet of the screw, and held to its place by guide rollers opposite to the wheel which press against the side of the screw, and keep the weight in proper position. The connection of the weight or moving power with the main wheel below and the train of wheels above the upper plate, is through two straight steel wires which pass through two opposite slots in the weight and terminate below in the arms of the main wheel, and above in the opposite ends of a cross bar which revolves on the top of the screw as a centre. As the weight rotates round the screw it pushes against these wires, carrying them round and the works with which they are directly connected. Should the weight be otherwise sustained even for a minute (as it is for an instant in raising it up after it has run down), a little spring fixed on its upper surface pushing against the wires carries them through the length of the slots, thus keeping up the movement of the clock. A little pinion on the upper side of the cross bar at its centre sets in motion the train of wheels for the hands. These are arranged upon a dial over the upper plate. The two plates are separated by three ornamental pillars, and over the whole is fitted tightly a glass cylinder, which, while it protects the works within completely from dust, leaves them in full view. The position of the weight is thus constantly seen; and at any time when it is nearly run down, it may be lifted up by means of a steel wire passing through the top of the cylinder and attached to some ornamental device for a handle. In lifting it there

is no rotation of the weight backward, but the little wheel on which it is suspended slips back with its axle sufficiently far to pass the fillets of the thread of the screw, and by means of a little spiral spring on its axis it is thrown forward ready to catch in any fillet at which the ascent of the weight is stopped. As the motive power acts uniformly, there is no need of compensation to regulate it, as in the use of the spring; and as its connection with the main wheel is direct, the additional friction and causes of irregularity introduced by the intervention of toothed wheels in other clocks are also avoided. The movement is regulated by the hair spring balance as in watches, a little hole being made near the base of the glass cylinder for the introduction of a fine wire to reach the regulator.

**SCREW JACK, or JACK SCREW,** a portable machine for raising very heavy weights, as buildings, &c. As it has commonly been constructed and used, it contains no screw, but within a short upright box or frame of great strength is fixed an iron rack working in a slide and passing up through the top of the box. It is raised by the teeth of a 3-leaved pinion attached to a wheel of 20 teeth or more, in which the teeth of another 4-leaved pinion engage. The axle of this pinion passes through the side of the box, and to the projecting end is attached a winch or handle. If this be 7 inches long, an applied force of 50 lbs. should sustain a weight of 11,000 lbs. The machine has recently been almost superseded by a hydraulic jack constructed on the principle of the Bramah press, having a reservoir of oil within itself, and using the same continuously. The working of this by hand causes a piston to ascend slowly with immense force; and at the end of its range, the weight being blocked up, the oil is let down, and the working of the machine is renewed.

**SCREW PRESS,** a machine in very general use for a great variety of purposes requiring heavy and continued pressure, though for many of these it is now giving place to the hydraulic press. Its principle has already been explained in the account of the screw, and also the manner in which its power may be increased to almost any extent by adding to the length of the lever by which the screw is turned, and bringing the threads into closer proximity to each other, or in other words diminishing the pitch of the screw. As usually constructed, the screw is set upright in a strong frame, its upper part turning in a nut which is secured in a cross bar of the frame. A globular or cylindrical head pierced with two holes at right angles to each other forms one or the other end of the screw, and is the support for the levers that are introduced into the holes to turn it. The moving piece, which is attached to the lower extremity of the screw in such manner as to be raised or depressed with it, without at the same time turning round, is called the follower, and through this the pressure is



exerted upon the articles placed beneath it. A steady motion is secured to the follower by means of the guides furnished by the sides of the frame. The cross bar and nut require to be made of great strength for resisting the upward pressure. This machine has been the common press for the use of farmers in making cider, pressing hay, cotton, &c., for bookbinders, printers, and numerous other artisans. It is variously modified by different devices for turning it, and is sometimes provided with the Hunter's screw already described, for increasing its power.

**SCREW PROPELLER.** See **STEAM NAVIGATION**.

**SCRIBE**, AUGUSTIN EUGÈNE, a French dramatist, born in Paris, Dec. 25, 1791, died there, Feb. 20, 1861. He was educated for the law, but early manifested a strong inclination for the drama, producing at the age of 20 *Les dervis*, a light comedy, which failed. His next attempts were scarcely more successful, and some of his plays were hissed from the stage. He persevered however, occasionally hitting the public taste, and about the beginning of the restoration wrote, in conjunction with Delestre-Poirson, *Une nuit de la garde nationale*, which was a complete success. Thenceforth his career was one of almost uninterrupted triumph, his pieces appearing in rapid succession at 2 and even 3 theatres at a time. In 1816 he brought out *Le nouveau Pourceaugnac* and *Le solliciteur*, which Schlegel thought better than Molière's *Misanthrope*. A new theatre having been established in 1820 by his friend Poirson, under the patronage of the duchess of Berri, he was engaged to write exclusively for it, and within a period of about 10 years (1821-'30) produced over 100 plays of various characters, many of which are still considered masterpieces of their kind, such as *Le mariage enfantin*, *Le colonel*, *Frontin mari garçon*, *La loge du portier*, *Le bûcher au porteur*, *La reine de seize ans*, *La marraine*, *Le diplomate*, *Le plus beau jour de la vie*, and *Le mariage de raison*. He received in his plays the assistance of several other dramatists, the chief of whom were Germain Delavigne, Mélesville, Dupin, Varner, Carmonche, and Bayard. In the mean time he had attempted other branches, and in 1822 brought out at the *théâtre Français* the drama of *Valérie*, the success of which is attributed mainly to the acting of Mlle. Mars. He also produced there *Le mariage d'argent* (1827); *Bertrand et Raton*, ou *l'art de conspirer* (1833); *Une passion secrète* (1834); *La camaraderie, ou la courte échelle* (1837); *Le terre d'eau* (1842); *Adrienne Lecouvreur* (1849); *Les contes de la reine de Navarre* and *La bataille de dames* (1851); *Mon étoile* (1853); *Feu Lionel* and *Les doigts de fée* (1858). He composed the libretti of *La dame blanche* (1825) for Boieldieu; *La neige* (1823), *La muette* (1828), *Fra Diavolo* (1830), *Le cheval de bronze* (1835), *L'ambasadrice* (1837), and *Le domino noir* (1841), for Auber; and *Robert le Diable* (1831), *Les Huguenots* (1836), *Le prophète* (1849), and

*L'étoile du Nord* (1854), for Meyerbeer. He also wrote several novels, as *Carlo Broschi*, *Une maîtresse anonyme*, *Judith*, *Le roi de carreau*, *Maurice*, and *Piquillo Alliaga*, all of which found many readers, although failing to make their mark in the literary world. In 1836 he was elected to the French academy. At an early stage of his career he had already secured a competence by his literary labors, and his wealth increased afterward at a rapid rate. He left the largest fortune that was ever accumulated in France by any literary man. As early as 1836 a catalogue of his works filled 36 columns of *La France littéraire*; now the whole number of his plays alone is estimated at more than 350. These have been printed separately, and in various dramatic collections, as the *Théâtre de madame*, *La France dramatique*, *Le magasin théâtral*, and *Le théâtre illustré*.

**SCRIBES** (Heb. *soferim*), a learned and hierarchical order among the Hebrews. The exact nature and duties of their office cannot be established with full certainty either from the Bible or other sources of information; but it seems that they were both lawyers and schoolmasters, whose duty it was to make transcripts of the law, to expound its difficulties, and to teach its doctrines. In the time of David the name of a scribe is mentioned among the high officers; and in the time of the kings they constituted a much esteemed and highly influential body, recognized and supported by the state. In the New Testament they appear as a body of high officers, members of the sanhedrim. They closely watched Jesus in order to detect him in some breach of the law, and sought to entangle him in a web of sophistries or to confound him by artful questions. Winer (in his *Realwörterbuch*) thinks that they formed a kind of temple police. Members of the body were found in every town of Galilee and Judæa, and they had great influence with the people. Some of them acted as professors in the outer courts of the temple, where they taught their pupils from elevated platforms. Celebrated among these instructors was Gamaliel. It is thought that it was in one of their class rooms that Jesus was found, when 12 years old, disputing with the doctors.

**SCRIPTURES**, HOLY. See **BIBLE**.

**SCRIVEN**, an E. co. of Ga., bordering on S. C., bounded E. by the Savannah river, and S. W. by the Ogeechee; area, 540 sq. m.; pop. in 1860, 8,274, of whom 4,580 were slaves. The surface is level and the soil sandy. Pine timber is exported largely. The productions in 1850 were 3,936 bales of cotton, 264,860 bushels of Indian corn, 131,620 of sweet potatoes, and 510,550 lbs. of rice. There were 8 grist mills, 6 saw mills, 13 churches, and 340 pupils attending school. Capital, Sylvania.

**SCROFULA**, a blood disease manifesting itself in a great variety of organs, and characterized when fully developed by the presence of a peculiar unorganized matter termed scrofulous. The name is derived from Lat. *scrofa*,

a sow, but why it is so termed must be left to fancy or conjecture. The disease is hereditary, being transmitted from parent to child, though like other hereditary diseases it frequently passes over one generation to attack the next. It is closely allied to pulmonary consumption; consumptive parents have often a scrofulous or strumous progeny, and *vice versa* strumous parents give birth to consumptive children. A damp cold atmosphere is favorable to its development, while it is probable that overcrowding and want of ventilation, aided by unwholesome and insufficient food, may originate it *de novo*. When the predisposition to the disease exists, every thing that tends to depress the vital forces exercises an unfavorable influence. The negro is more subject to scrofula than the white man. The inferior animals are often attacked by it, particularly those that are indigenous to hot climates; stabling horses and cows in dark, damp, and unventilated stables readily causes its production.—The scrofulous habit, when strongly marked, is easily recognized. If the skin be fair, the complexion is often peculiarly brilliant, but the color seems laid on in one large patch, leaving the surrounding skin of an unnatural whiteness; the wings of the nose are thick, the upper lip often swollen, and the lips become cracked and rough on exposure to cold. The skin is unusually delicate and irritable; the patient suffers very readily from chilblains, and in childhood is more liable than others to cutaneous diseases. The mucous membranes partake the delicacy and irritability of the skin. The edges of the eyelids are apt to be red and swollen; the eye is very liable to be attacked by a peculiar inflammation (see OPHTHALMIA); hæmorrhage from the nose, cold in the head, and enlarged tonsils are frequent. The muscles commonly want firmness, and the whole system is deficient in stamina. Sometimes the scrofulous diathesis is marked by a dark complexion, a rough, dry skin, a pasty, unhealthy look; the movements are sluggish, the habit of body indolent, and the intellect dull. When scrofula is fairly developed, its essential element consists in the presence of an unorganized, brittle material, generally of the consistence of new cheese. In the lungs the presence of this matter constitutes tubercular consumption; in the mesenteric glands, *tubercles mesenterica*; in the arachnoid membrane of the brain, acute hydrocephalus; in the lymphatic glands, bones, &c., scrofula. Scrofula is eminently a disease of childhood, while consumption belongs to a later period of life; but neither is confined to any age. One of the forms in which scrofula most commonly and earliest shows itself is swellings of the lymphatic glands in various parts of the body, more particularly about the neck. These become enlarged, firmer, and after a time a deposition of the peculiar curd-like matter is found to have taken place in their interior. These swellings sometimes attain an enormous size and cause great deformity. After a time sup-

uration occurs, the swellings become softer, and the skin over them assumes a dusky red hue, gradually becomes thinner, and finally bursts, giving outlet to an unhealthy pus mixed with the curd-like deposit of the disease. The ulcers thus left heal slowly and with difficulty, and unless great care is exercised produce deformed cicatrices. Occasionally, but rarely, scrofulous glands undergo a process of cure without the occurrence of suppuration, the swelling gradually subsiding, and the tuberculous matter, by the absorption of its thinner part, being converted into a chalky concretion.—Strumous patients are liable to what are sometimes called cold abscesses. Large collections of matter are formed slowly without much heat or pain, and on bursting or being opened give outlet to a thin whey-like pus, intermixed with curdy flakes. The mucous membrane of the nose, too, is commonly thickened and frequently inflamed, so that strumous patients ordinarily breathe with the mouth open; sometimes ulceration of the mucous membrane takes place, and the bones beneath become carious, causing a horribly fetid odor. This constitutes *ozæna*; though more commonly produced by a combination of scrofula and syphilis, it is often caused by scrofula alone. The same tendency exists in the lining membrane of the external ear, which frequently becomes swollen and painful, giving rise to purulent discharges which when chronic are apt to be exceedingly offensive; in these cases the drum of the ear is sometimes perforated, the small bones lost, and permanent deafness caused. In like manner strumous women are liable to profuse leucorrhœal discharges. Scrofulous affection of the joints constitutes hip-joint disease (*morbis coxarius*) and white swelling; in the shafts of the long bones and their periosteum it causes caries; in the vertebræ it gives rise to Pott's disease (caries of the vertebræ), terminating in angular curvature of the spine. In short, there is scarcely any tissue of the body but may be invaded by it; while the scrofulous diathesis is eminently favorable to lupus, albuminuria, rickets, and a host of other diseases, and it modifies unfavorably most if not all the diseases to which we are liable; the combination of scrofula and syphilis is particularly unmanageable.—In the management of strumous children much can be done to guard against the development of the disease. If the mother be affected, a healthy wet nurse if possible should be employed; the sleeping room of the child should be large and well ventilated; it should be bathed daily, at first in warm, and as it acquires strength in cold water, well dried, and thoroughly rubbed; it should be warmly clothed, and exposed as much as possible to the light and air. As it advances in age, the diet should be simple and digestible, but abundant and nutritious; the child should have reasonable but not excessive exercise, and should be in the open air as much as possible; while if it be, as is frequently the case, bright and precocious,

great care should be taken not to stimulate its intellect too early and too much. When the disease shows itself, a residence by the seaside during the summer season is frequently of service. Remedial agents are to be sought in the preparations of iron and iodine, in quinine and the bitter tonics. In strumous children calomel is particularly valuable as a purgative; it may be combined with soda and followed by oil or compound infusion of senna, or it may be given with rhubarb or compound jalap powder. Sometimes minute doses of the bichloride of mercury mixed with the compound tincture of cinchona (Huxham's tincture of bark) are of manifest benefit. The homœopaths use calcaria, cina, sulphur, baryta, and surum to remove a tendency to scrofula; conium, dulcamara, spongia, and lycoodium in many of the chronic glandular affections which attend the disease; *rhus toxicodendron* in scrofulous skin affections; calcaria and causticum in scrofulous ophthalmia; belladonna, mercury, and aconite in acute scrofulous affections. If these remedies fail, Hartmann recommends preparations of iron, bark, and cod liver oil, with or without the aid of spongia and iodine.

SCRUPLE (Lat. *scrupulum*, a little pebble), a weight equal to the 8d part of a dram or the 24th part of an ounce, as used by apothecaries. The *scrupulum* (also written *scripulum* and *scriptulum*) was  $\frac{1}{24}$  of the Roman *uncia*, and afterward  $\frac{1}{60}$  of an hour. The 60th part of this was *scrupulum secundum*, and the 60th of this *scrupulum tertium*, whence our terms seconds and thirds applied to these divisions. The common application of the word scruple to designate an objection or difficulty is supposed to have originated from the *scrupulum* or little pebble used as a weight often causing inconvenience by getting into the sandal.

SCUDDER, JOHN, M.D., an American missionary, born in New Brunswick, N. J., Sept. 8, 1793, died at Wynberg, Cape of Good Hope, Jan. 13, 1855. He was graduated at Princeton college in 1813, studied medicine in the office of Dr. Samuel Forman at Freehold, N. J., and after receiving his diploma settled in New York, where he had previously been house surgeon of the city hospital. While engaged in a very extensive practice, he offered himself to the American board as a missionary, studied theology, and in 1819 was ordained as a minister of the Reformed Dutch church on board the ship which carried him to India. For 19 years he labored in Ceylon, where he conducted a large hospital, and attained a high reputation as a surgeon and physician, treating jungle fever and cholera with great success. He also had the superintendence of a number of schools, and made frequent tours into the interior. In 1839 he was transferred to the Madras mission. In 1842 he made a visit to America, and after his return to India in 1846 resumed his labors, but in 1854 went for the sake of his health to the Cape of Good Hope, where he died. He published "The Redeemer's Last Command,"

"The Harvest Perishing," "An Appeal to Mothers," "Knocking at the Door," "Passing over Jordan," "Letters to Children on Missionary Subjects," "Grandpapa and Little Mary," &c. He had 8 sons and 2 daughters, all of whom devoted themselves to missionary labor.

SCUDÉRY, or SCUDÉRI, GEORGES DE, a French dramatist and novelist, born in Havre about 1601, died in Paris, May 14, 1667. After serving with honor in the army, he devoted himself to literature, produced his first play in 1631, and soon took rank among the most successful poets of the time. In 1637, nettled at Corneille's unparalleled success, he published a critical pamphlet, entitled *Observations sur le Cid*, which made such an impression that Cardinal Richelieu ordered the newly established French academy to act as an umpire between the great dramatist and his critic; the society gave their verdict for the former in their *Sentiments de l'académie sur le Cid*. In 1644 Scudéry had published no fewer than 16 plays, most of which were 5-act dramas, assisted his sister in writing her first novels, and been appointed governor of the fortress of Notre Dame de la Garde, near Marseilles. In 1650 he was elected to the French academy, and in 1654 published *Alaric, ou Rome vaincue*, an epic poem. Notwithstanding his temporary popularity, it is now admitted that Corneille was right when he called him *un fou solennel*.—MADELEINE DE, a French authoress, sister of the preceding, born in Havre, June 15, 1607, died in Paris, June 2, 1701. Having removed to Paris, she wrote one or two novels with the assistance of her brother, and afterward a number without his aid, and was one of the brightest ornaments of the Hôtel Rambouillet. She was proclaimed "another Sappho" and a "tenth muse." Her novels were interspersed with delineations of the society in which she moved, and portraits, under assumed names, of distinguished persons with whom she was acquainted. This was especially the case with the most celebrated of her works, *Artamène, ou le grand Cyrus* (10 vols. 8vo., Paris, 1650), which has lately been the subject of an elegant essay by Victor Cousin; and *De la société au XVII<sup>e</sup> siècle d'après le grand Cyrus* (2 vols. 8vo., 1659). Among her other works are: *Clélie, histoire Romaine* (10 vols. 8vo., 1656); *Les femmes illustres, ou les harangues héroïques* (12mo., 1665); *Conversations sur divers sujets* (4 vols. 12mo., 1680-'84); *Conversations de morale* (4 vols. 12mo., 1686-'8); and a number of miscellaneous poems. Her ponderous romances are now sought after only as literary curiosities.

SCULPIN. See BULLHEAD.

SCULPTURE (Lat. *sculpo*, to cut out, to carve), literally, the art of cutting or carving any substance into images of men, beasts, or other objects. The term, however, is used generally to indicate any process by which the forms of objects are represented by solid substances, and therefore includes carving, modelling, casting, whether in metal or other materials,

and gem engraving. Sculptured images consist either of insulated figures or parts of figures or groups, technically called the "round;" of figures attached to a background, from which they are more or less raised, and designated according to the degree of the "relief," as it is termed, *alto-rilievo*, *basso-rilievo*, and *mezzo-rilievo*; or of figures which, without projecting from the face of the original ground, have their outlines sunk into it, and are rounded on the principles of *basso-rilievo*. This method of working occurs chiefly in Egyptian sculpture, and may be termed a kind of relieved *intaglio*. The materials employed by the sculptor in the various processes of his art include almost every substance capable of being carved, cast, or moulded. For carving, porphyry, basalt, granite, marbles of many varieties, alabaster, ivory, bone, and wood have been in use from a remote period, the three first named substances being those used by the Egyptians, while the Greeks and Romans worked chiefly in marble. Of the latter material, that most esteemed by the ancients was the pure white marble found in the island of Paros, and thence called Parian, next to which in quality was that procured from Mounts Pentelicus and Hymettus in the neighborhood of Athens. The finest Italian marble was the Carrara, which still maintains its old celebrity; but many Roman sculptors wrought from marbles procured in Africa. The finest marbles in modern use are from Italy. Alabaster sculpture is best illustrated by specimens exhumed at Nineveh. Wood was chiefly employed in the primitive stages of the art, and the kinds most in vogue were oak, cedar, cypress, sycamore, pine, box, fig, and ebony. Few works of this description are extant, notwithstanding Pliny and other ancient authors speak of the durability of ebony, cedar, and other species. Occasionally figures for special purposes, as funeral ceremonies, were made of aromatic gums, and even of hay. For modelling, clay, stucco, plaster, and wax were used in the infancy of the art; and images of baked clay, known as terra cotta work, were indefinitely multiplied by means of moulds of the same material, into which the soft clay was pressed. Terra cotta was used for an infinite variety of purposes beside statuary, the objects formed from it being generally of small size and painted, and of a hardness, produced by the action of fire, almost equalling that of stone. The metals employed in casting are gold, silver, iron, tin, copper, lead, and their compounds. Electrum, a substance formed of 1 part of gold to 4 of silver, was used as remotely as the Homeric age; but the composition called by the Greeks χαλκος, by the Romans æs, and by the moderns bronze, has in all ages been preferred for the purposes of sculpture to any other metal, and the greater part of the antique statues and sculptured ornaments now extant have been formed from it. From the varieties mentioned by ancient writers, it would appear that many centuries before

the Christian era a very considerable degree of skill had been acquired in its preparation; and the colossal proportions of many of the bronze works extant or on record point to a facility in the processes of casting superior perhaps to the art of modern times. Metal statues, however, were not always cast, but, in the earlier ages at least, were made of small plates hammered into the desired shape, and fastened by nails or cramps, and in later times by a kind of cement or solder, or of solid pieces beaten into shape. Sometimes, according to ancient authors, peculiar effects of color, such as a blush or pallor upon the cheeks, were given by Greek sculptors to works of this class by a fusion of different metals; but the descriptions by Plutarch and others do not afford a very satisfactory account of the process, and it seems more probable that the statues were colored after being cast, as Pliny says was the practice with the Egyptians. The coloring of sculpture, however, was not confined to bronzes, but among barbarous nations, as well as with the refined Greeks, statues in marble and other materials were frequently heightened by color and a profusion of ornament, whence they were called polychromic. When different kinds of marbles or stone and of different colors were combined in the same work, it was called poly-lithic, to distinguish it from the simpler monolithic sculpture. Both methods are distinct from the so called toreutic art of the ancients, which included the working of precious metals combined with other substances, as exemplified in Homer's description of the shield of Achilles. The Greek sculptors sometimes introduced foreign substances into marble statues, as precious stones or glass for eyes, a practice utterly irreconcilable with modern taste, and which can only be explained by the influence which the caprices of fashion exercise over art even in its best periods. A species of sculpture called chryselephantine, in which the flesh parts of the figure were of ivory and the draperies of gold, was also employed by them for statues of tutelar divinities intended to testify to the wealth, liberality, or piety of a state or individual. Of this class of works the statue of the Olympian Zeus by Phidias is the most illustrious example.—In point of date sculpture was probably the earliest developed of the imitative arts, the moulding of clay or other plastic substances into defined shapes being to an imperfectly educated mind a more obvious method of copying an object than the representation of its appearance by lines on a flat surface. The origin of the art is so involved in myths and allegories that any attempt to ascribe its invention to a particular nation or individual is impossible. So far as experience has shown, it had no special birthplace, but sprung up naturally in all countries, taking its origin everywhere in the imitative faculty of man. Painting and sculpture, it has been observed, existed among the Greeks from time immemorial; "and if there are any resemblances between the earliest

works of Grecian art and those of Egypt, we have still no right to infer that the Greeks learned them from the Egyptians; and we might as well assert that the Greeks learned their arts from the Gauls or the Siamese, for the works of these nations also resemble those of early Greece." The first efforts in sculpture were probably monumental, and originated in a desire to perpetuate the memory of remarkable persons or events. A block of stone rudely fashioned into some simple form, or even a pile of stones, was at first sufficient for this purpose; and repeated instances occur in the Mosaic history of the erection of monuments of this kind. The next step in the progress of the art may be traced to the desire in a primitive state of society for some visible, tangible object representing the deity commonly worshipped, and whose divine attributes could not otherwise be appreciated. But as the deities worshipped by the earliest races were heavenly bodies or abstract qualities, such representations could only be symbolical; hence in all probability the first statues of gods were simple pillars of stone having no resemblance to the human figure, and indicating their purpose only by certain marks or hieroglyphics carved upon them; and the first statues fulfilling in any considerable degree the conditions of art were of men distinguished as heroes, benefactors, or founders of nations. When in process of time such individuals had, through the respect and admiration which their actions inspired, become invested with divine attributes, the visible representation of their forms as objects of worship became necessary, and sculpture first assumed its legitimate functions. The art, thus early associated with religious worship, was naturally considered a sacred one, inapplicable to ordinary purposes, and in many instances was in practice wholly controlled by hierarchical influence. The supernatural character assigned by superstitious and savage races to the forms of these newly created deities, as exemplified in the monstrous creations of the Chinese, Hindoo, and Egyptian mythology, was gradually embodied in certain fixed types from which no deviation was permitted; and this circumstance, together with the limited field of practice, caused sculpture in many parts of the world to remain almost from its birth a mere mechanical art. The Greeks, as will presently appear, formed the most notable exception to this rule.—The first artists on record as sculptors are Bezaleel and Aholiab (about 1500 B. C.), who made the ornaments of the tabernacle (Exod. xxxi.), although long previous to their time the art of working in metal, stone, and wood was known to various eastern nations. Abundant passages in the Old Testament show that the Hebrews practised it with success, as also their neighbors the Phœnicians; and it is to be regretted that no specimens of the sculpture of either nation remain. Of Assyrian sculpture nothing was known from actual observation previous to the recent excavations

of Botta, Layard, and their successors, by which the arts of a race whose history is lost in the mythical ages have been suddenly and minutely brought to light. The specimens exhibited are for the most part bass-reliefs on alabaster slabs, the subjects delineated being colossal human-headed bulls and other grotesque personages from the Assyrian mythology, battles, hunting scenes, processions, ceremonials, &c., executed according to a code of conventional rules which must have proved fatal to the development of original genius in the sculptor. Although none of them can be assigned a high rank as works of art, the spectator cannot but be struck by the majesty and even the severe grandeur of some of the larger figures, and by the skill with which the characteristics of individual animals and the details of elaborate compositions are represented. The existing examples embrace 8 distinctly marked periods, from about 930 B. C., the probable age of Sardanapalus, to 625 B. C., the date of the destruction of Nineveh, and are in many respects unlike the sculpture of other nations. (See NINEVEH.) Of the wonders of Babylon and the perfection to which the Chaldeans carried the art of casting in bronze and the precious metals, we know nothing beyond the accounts which Herodotus and other ancient writers have left us. Among the Persians sculpture was never employed for religious purposes, and the art as practised by them was evidently derived from the Assyrians. Worshipping no deity which could be represented by any form, whether of man or beast, they regarded images of gods as marks of barbarism and impiety; and wherever they appeared as conquerors such works, with the temples enclosing them, were religiously destroyed. But their art, notwithstanding it was unrestrained by hierarchical influences, was never marked by taste or in any sense progressive. The sculptures of Persepolis represent principally processions and combats, the figures in which are heavily draped and exhibit little variety, action, or character. The sculpture of the remoter eastern nations, including the Chinese and Hindoos, has little to recommend it in the qualities of art, however interesting to the historian or archaeologist, and affords no assistance in tracing the history of our subject. The hierarchical authority, by confining its exercise to mythological subjects, prevented it from becoming imitative or progressive—a circumstance the more to be regretted, as in some instances there are indications of considerable native power in the artists, which the rules hampering their efforts could not always repress. It must be confessed, however, that in vastness of scale and the sentiment of repose the Hindoo sculptures at Ellora, Elephanta, and elsewhere, are equal to the productions of any Asiatic race.—The Egyptians, perhaps more than any other nation of antiquity, associated the art of sculpture with religious worship; hence most of their works of this

class comprise representations of divinities and their attributes or qualities. From a period antecedent to historical times their artists formed a sort of hereditary craft, whose labors, controlled by a rigid code of rules prescribed by the sacerdotal authority, exhibit during nearly 2,000 years a uniformity of results so striking as to justify the statement that until the conquest of the country by the Macedonian Greeks, 320 B. C., there was but one epoch in Egyptian sculpture. A Græco-Egyptian style succeeded, and expired with the art itself. Not only were the artists forbidden to make innovations, but they were never allowed, Plato tells us, "to invent any new subjects or any new habits. Hence the art remains the same, the rules of it the same." The standard types of form, selected in a primitive age, were necessarily archaic in character and deficient in action and expression, which will account for the utter absence of any thing approaching grace, symmetry, or elegance in Egyptian art. The figures are generally equally poised on both legs, one of which is sometimes slightly advanced; the arms either hang down straight on each side, or if one be raised, it is at a right angle across the body; and the head looks directly in front. Many statues, however, are seated or kneeling, the former attitude being that in which, on the whole, Egyptian sculptors excelled; and in the colossal sitting figures of their kings there is frequently a grandeur of proportion and a repose and dignity of expression which greatly impress the beholder. Anatomy was little regarded in representations of the human form, and the draperies were of the simplest character, frequently falling straight to the ground, without folds. Where elaborate representations in bass-relief or intaglio of battles, processions, or religious ceremonies were attempted, greater freedom seems to have been allowed the artist; and in this class of works, as well as in occasional heads, such as the so called Young Memnon in the British museum, there are evidences of inventive power and a feeling for ideal beauty, which, but for the restraints imposed upon the sculptor, might have borne worthy fruits. Egyptian sculpture of all kinds was usually colored, and statues formed of the hardest granite, the material most commonly employed, are as cleanly cut as marble and beautifully polished.—Etrurian sculpture, so far as can be ascertained by existing specimens, was connected in a greater or less degree with that of the Greeks, although there is reason to believe that previous to the arrival of Greek colonists in Etruria a purely national style was in existence there. K. O. Müller has observed that the art of the country, being receptive rather than creative, and not indigenous to the soil, began to decline as soon as deprived of the Greek influence. The best specimens of Etruscan sculpture in existence are bronze works of the style known as *Tuscanica signa*, which were highly esteemed

by Roman connoisseurs. They are characterized by a stiff, archaic style resembling the early Greek, and which seems to have been retained as the standard, the result doubtless of causes similar to those which influenced Egyptian art. Well known examples of Etruscan bronzes are the "She Wolf" of the capitol at Rome, and the "Chimæra" at Florence. Innumerable smaller figures have been found, and such was the facility of the people in casting, that after the capture of Volsinii by the Romans, about 280 B. C., 2,000 statues in bronze were carried away by the victors. Etruscan carvings, whether in wood or stone, are unskilful, but their terra cotta vases and ornamental work are of high artistic value. The Tuscan vases, however, so celebrated for their elegance of form and the paintings with which they are embellished, are now believed to be of Greek origin.—In the hands of the Greeks sculpture was brought to a degree of perfection scarcely approached in modern times, and quite as marked, in comparison with the progress of other ancient nations, as their superiority in every department of imitative art and literature. Similar causes contributed to this universal excellence, the principal of which, according to Winckelmann, were the innate genius of the people, their religion, and their social and political institutions. While in Egypt and the East generally, and even among the Etrurians, art never advanced beyond the types established almost at its birth, the Greeks, led on by an intuitive sense of beauty, which was with them almost a religious principle, aimed at an ideal perfection, and, by making nature in her most perfect forms their model, "acquired a facility and a power of representing every class of form unattained by any other people, and which have rendered the terms Greek and perfection, with reference to art, almost synonymous." In respect to climate, physical beauty, manual or mechanical dexterity, or material prosperity, all of which are regarded as important conditions toward excellence in art, the Greeks had little if any advantage over contemporary races; and yet, whatever was the purpose to which sculpture was applied, their superiority, owing to the causes enumerated, was indisputable. Like the works of the painters who effected the revival of art in modern times, the sculptures of the best period in Greek history were almost exclusively of a public character, intended for the moral or religious improvement of the people, or as an incentive to noble deeds. When the sculptor ceased to be influenced by this high purpose, his art began to decline, as Italian art under similar conditions languished after the brilliant period of Raphael. Greek sculpture may be divided into a semi-mythic or archaic period, a period of grandeur and power, a period of refinement or physical beauty, and a period of decline. The remains of the first period are not unlike the earlier attempts of other nations, although at its close, notwith-

standing the hierarchical influence, a steady progress toward excellence is discernible. The first sculptors on record are of a purely mythical character, and may be regarded as personifications of particular branches of art, or the representatives of families of artists, rather than actual personages. Such was Dædalus, whose name indicates merely an artist in general, and of whom it has been observed that "the stories respecting him are more like allegorical accounts of the progress of the arts than any thing else." For many ages sculptors claimed an actual descent from Dædalus, whence they were called Dædalids; and their works, known as *δαίδαλα*, represent the first attempts to replace the blocks of wood and stone which originally symbolized the images of deities, by statues having some resemblance to life or nature. These were generally of wood, ornamented with gilding, colors, and real drapery, although long before the commencement of authentic history other materials began to be used. Phidon of Argos, who is said to have struck the first money in Greece (748 B. C.), probably introduced the employment of metals in statuary; and the most ancient Greek statue in this material mentioned by classical authors, was one in bronze of Zeus, by Learchus of Rhegium, who is supposed to have flourished as early as 700 B. C. This, however, was constructed of thin plates bent into the required shape, and riveted together. Glaucus of Chios or Samos (680) was the reputed inventor of the art of soldering metals; and to Rhæcus of Samos, and his sons Telecles and Theodorus, was ascribed the invention of modelling and casting metals, beside other improvements in the art (600-550). Pliny is of opinion that the first marble statues date from the commencement of the Olympiads, although Dipœnus and Scyllis of Crete, who flourished in the early part of the 6th century before our era, are the first artists who were celebrated for their works in marble. Sculptured figures on architectural monuments, however, were executed as early as the Homeric epoch, such as the two lions in relief on the ancient gate of Mycenæ. The period between the age of Homer and the 50th Olympiad (580), comprising about 3 centuries, witnessed the discovery of the chief processes essential to the practice of sculpture; but, from the restraints imposed by religion, the art made little progress even among the Asiatic Greeks, by whom it was most successfully cultivated. Statues of gods after fixed types were almost the only ones made. Toward the middle of the 6th century those changes took place by which the early archaic style was gradually merged in that of the 2d epoch. The athletic contests at the public games familiarized the artists with the beautiful forms of the human body, and the practice of erecting statues of the victors in these contests, which commenced about 550, gave a surprising impulse to the art. The subject, not being of a religious character, ad-

mitted of a greater play of inventive powers, and the improvement thus produced in the statues of men was extended to those of gods, which gradually began to assume grace and grandeur of form. The hereditary cultivation of sculpture, under the influence of which conventional types were carefully transmitted to successive generations, also ceased about this time, and individual artists were left free to follow the dictates of their own genius. These circumstances, together with the disastrous consequences to Asiatic art of the Ionian revolt against Darius Hystaspis, and the patriotic spirit evoked by the Persian invasion, gave increasing vigor to sculpture in Greece proper, where, early in the 5th century, the hardness and stiffness of the first period are lost in the grandeur and ideal beauty of Phidias and his contemporaries. Many works in marble and bronze belonging to the latter or transition portion of the archaic period are still extant, the most characteristic being the Selinuntine and Æginetan marbles, now deposited in Palermo and Munich, and which formed part of the decorations of temples. Sicyon, Ægina, and Argos had hitherto been the chief schools of the art; but during the period upon which we are now entering, from 480 to about 400 B. C., Athens was its most distinguished seat, her supremacy being disputed only by Argos. The Athenian and Argive sculptors, animated by the intellectual activity which the Persian invasion developed, and which manifested itself not merely in the cultivation of literature and the fine arts, but in all the social and political relations of the Hellenic races, vied with each other in disseminating over Greece and her colonies a series of works which became the models of form for their countrymen as well as for all succeeding sculptors. Statuary was at this time almost exclusively of a public character, and the chief sculptors, Hegias, Pythagoras of Rhegium, Calamis, Ageladas, Phidias, Agoracitus, Alcamenes, Myron, and Polyclethus, are known chiefly by their statues of gods and heroes and their historical groups for the temples, porticos, theatres, and gymnasias, built from the spoils of war or the profits of newly developing commerce. Of these, Phidias, Myron, and Polyclethus, all scholars of Ageladas, were the most famous, and their works exhibited the dignity and almost passionless tranquillity of mind characteristic of a heroic age, and of the lofty purposes for which its artists labored. Phidias of Athens, whose name is associated with the noblest architectural monuments and sculptures of the splendid era of Pericles, is generally placed at the head of all the sculptors of antiquity in the qualities of sublimity and severe beauty, his works bearing the same relation to those of subsequent stages of the art that the dramas of Æschylus do to the more polished productions of Sophocles or Euripides. His chryselephantine statues of Athena and the Olympian Zeus, the most celebrated of the kind ever made, exist only in the descrip-



tions of ancient authors; but in the Elgin marbles, executed under his direction and in part perhaps by himself, we fortunately have splendid and characteristic specimens of his genius. (See ELGIN MARBLES, and PHIDIAS.) The Phigalian marbles in the British museum, and the casts of the sculptured fragments from the temple of Theseus, in the same institution, are also in the style of Phidias or his school. Myron, who worked chiefly in bronze, was a great master of expression, and, from the frequent and honorable mention of him by classical authors, must have been one of the most esteemed sculptors of antiquity. He was celebrated for his figures of animals, but the *discobolus* or quoit player, of which the Palazzo Massimo in Rome and the British museum possess copies, is the only work by which he is now known. Polycleetus, the head of the Argive school, as Phidias was of that of Athens, rivalled his great contemporary in every department of his art except the representations of gods, in which Phidias was never equalled. He even gained a victory over him in the representation of an Amazon. His statues of athletes were considered the perfection of manly beauty, and a youthful *doryphorus* was so accurately proportioned as to be regarded as a standing model for sculptors. Toward the close of the Peloponnesian war a change took place in the habits and feelings of the Athenian people, under the influence of which a new school of statuary was developed. The people, enervated by luxury and craving the pleasures and excitements which the prosperity of the age of Pericles had opened to them, regarded the severe forms of the older masters with even less patience than the austere virtues of the generation which had driven the Persians out of Greece. The sculptors, giving a reflex of the time in their productions, instead of the grand and sublime, cultivated the soft, the graceful, and the flowing, and aimed at an expression of stronger passion and deeper feeling. Jupiter, Juno, and Minerva, the favorite subjects of the Phidian era, gave place to such deities as Venus, Bacchus, and Amor, and with the departure of the older gods departed also the serene and composed majesty which had marked the representations of them. The great sculptors of this period of refinement or sensuous beauty, which commences about 400, were Scopas, Praxiteles, and Lysippus, by whom the art was brought to almost absolute perfection in respect to gracefulness of form and expression and technical qualities. Scopas excelled in single figures and groups, combining strength of expression with grace, rather than in architectural sculpture, and has left a remarkable specimen of his skill in the celebrated group of Niobe and her children in the museum at Florence. The *Venus Victrix* of the Louvre, called also the Venus of Milo, was formerly attributed to him, but is now assigned to Agesander of Rhodes. The slab from the mausoleum of Halicarnassus, representing the battle of the

Amazons, now in the British museum, is undoubtedly from his hand. Praxiteles was unsurpassed in representing the softer beauties of the human form, especially the female figure, and his statue of the Cnidian Aphrodite, modelled from the courtesan Phryne, was a masterpiece of sensual charms. This work is said to have been the first instance in which any artist had ventured to represent the goddess entirely divested of drapery, and the new ideal thus formed was frequently imitated by succeeding artists. It is doubtful whether any copies of it are in existence, although the Venus of the Vatican and that of the Museo Pio Clementino are supposed to be such. The works of these two artists were executed chiefly in Parian marble, a material which now came into general use for single figures or groups, while the costly chryselephantine statues, and those made of wood and stone, called acroliths, gradually disappear from sight. While Scopas and Praxiteles represented what is known as the later Attic school, Lysippus of Sicyon carried out the principles of the Argive school of Polycleetus by representing physical beauty and athletic power in its highest perfection. He paid great attention to details, and by a careful imitation of nature gave a realistic character to his productions, under the influence of which portrait statues began to take the place of ideal creations. He appears to have worked exclusively in bronze, and was the favorite sculptor of Alexander the Great, whose statues he had the exclusive privilege of making. The commencement of the 4th and last period in Greek sculpture, about 320 B. C., found the schools of Praxiteles and Lysippus in considerable vigor, although the artists contented themselves with imitating their predecessors rather than opening any original path of design. Sculpture consequently began to decline, its decay being hastened by the disturbances which followed the dismemberment of Alexander's vast empire. Until the middle of the 3d century B. C., however, there appears to have been no lack of reputable artists, and a number of new schools sprung up in Rhodes, Alexandria, Pergamus, Ephesus, and elsewhere in the East, the followers of which too frequently lent their talents to the execution of grossly flattering portraits of kings, and other unworthy purposes. The school of Rhodes could boast of Chares, the sculptor of the famous Colossus. The art of this period is creditably represented by Agesander's group of Laocoön and his sons, which, together with the Farnese bull at Naples, emanated, according to Pliny, from the Rhodian school; the "Hermaphrodite" at Paris; the torso of the Belvedere at Rome; the Farnese Hercules, and the "Fighting Gladiator." Bronze and marble were the materials principally in vogue, although the former was gradually superseded by the latter. Shortly before the capture of Corinth by the Roman general Mummius, 146 B. C., a transient revival took place in Athens, during which the statue known as the Venus de' Medici was produced

by Cleomenes; but the reduction of Greece to the condition of a Roman province gave the death blow to the art, which thenceforth degenerated into a mere handicraft. The ancient seats of civilization, stripped by the conquerors of their choicest art treasures, no longer afforded to the sculptor the models consecrated by time and national pride; and the Greeks, having neither the means nor the high inducements to practise their art at home possessed by preceding generations, transferred their labors in the 1st century before our era to Italy.—As early as the consulship of P. Cornelius Scipio, 161 B. C., the city of Rome possessed numerous statues of gods and public men, executed probably by Greek and Etruscan sculptors, the latter of whom had long previously made the Romans familiar with their peculiar artistic creations. The overthrow of Greece and her colonies, however, gave the first impulse to the cultivation of sculpture in the Italian peninsula; and after the wholesale plundering of Greek cities by Sylla in 86 B. C., a taste for art and for collecting choice specimens of sculpture and painting began to be developed among the wealthy Romans, some of whom, like Verres, were not less remarkable for their rapacity than their enthusiasm, although their efforts stayed for a time the destruction of many precious works. Toward the close of the republic Rome was full of Greek sculptors, some of whom, without having much originality of conception, were not unworthy descendants of the great schools of their native country. A creditable specimen of their skill is afforded in the so called statue of Germanicus in the Louvre. Julius Cæsar was an intelligent collector of statuary, and during the Augustan age the art was liberally encouraged by the emperor and other powerful patrons. Caligula and Nero ransacked Greece for sculptures, and the former introduced the barbarous custom of decapitating the statues of gods and illustrious men for the purpose of substituting his own likeness, in which he was imitated by many of his successors. Down to the time of Trajan, the principal sculptured works consisted of reliefs on public monuments, such as those adorning the arches of Titus and Trajan, and statues and busts of the emperors, many of which are meritorious in point of execution, and display considerable fancy and invention in the treatment. The vigorous character of Trajan gave new life to the arts in Greece and Rome, and the reigns of himself and his successors Hadrian and Antoninus Pius have been called the golden age of Italian sculpture. Hadrian was one of the most accomplished connoisseurs of the time, as was evinced by the modern excavations at his villa near Tivoli, and by his influence induced contemporary sculptors to exchange the representations of common subjects, to which they had gradually begun to confine themselves, for those more characteristic of the early sculptors. The pure Greek style was revived with considerable success, and contemporary with

it flourished another, half Greek and half Egyptian, suggested by the recent introduction of the worship of Egyptian deities into Italy. The portrait statues of this period are particularly fine, and the ideal creations, of which the statues and busts of the emperor's favorite Antinous may be regarded as specimens, have been placed on an equality with the works of the most finished Greek period. The efforts of Herodes Atticus, one of the most liberal and enlightened patrons of art on record, also did much to prolong its revival; but after the middle of the 2d century of our era it exhibited an uninterrupted decline. The sculptures on the arch of Septimius Severus (A. D. 203) are far inferior to the productions of Hadrian's time; and those on the arch of Constantine, erected a century later, show that originality of design and executive ability were then nearly extinct. The dismemberment of the empire completed the destruction of the arts in Italy, and during the troubled ages which succeeded, the finest efforts of the old sculptors fell a prey to barbarian or iconoclastic fury, or were destroyed in conflagrations. Constantinople, in which a vast number of bronzes, marbles, and pictures had been collected by the eastern emperors, continued for several centuries to be almost the only repository of such objects; but the capture of the city by the Latins under Baldwin in 1203 having involved these in destruction, the knowledge of antique art for a time passed away from the world.—Roman sculpture may be described in general terms as a continuation of that of Greece; the best artists were Greeks, and there is no record of the production of a work of any considerable merit by a native sculptor. Italy nevertheless claims the honor of having been the seat of the revival in modern times, not of sculpture merely, but of all the imitative arts. During the period known as the dark ages the arts were in some degree kept alive by the monks of the early Greek and Latin churches; but a style and treatment founded on new conceptions of the purposes to which art should be applied and guided by Christianity, had gradually superseded those of pagan artists. The general causes which produced this result are enumerated in the article PAINTING. With Nicola Pisano, who flourished in the first half of the 13th century, the authentic history of modern sculpture properly commences, notwithstanding the preceding century had witnessed the production of works of decided originality, if rude and repulsive in comparison with the wonders of the Greek schools. The mission of the sculptor was similar to that of the Greek artists in the archaic or Phidian period; but unlike the latter, who improved upon established types, he was compelled to have direct recourse to nature as it existed about him, the remains of antique art then extant being too insignificant to afford models, and according in no respect with the severe and religious character of the age. Hence modern

sculpture, and indeed every department of modern art, was at the outset as widely separated from that of the Greek schools, as the religion which inspired it differed from every system which had preceded. Nicola and his son, Giovanni Pisano, were among the first to practise sculpture as a separate art, and the distinctive character which it assumed in their hands gave the first decided impulse to its cultivation in Italy. Their works, consisting of bass-reliefs on the façades and pulpits of churches in Pisa, Orvieto, Sienna, and other Italian cities, exhibit a beauty and simplicity of composition, and a force of expression, which abundantly compensate for technical shortcomings. Their conceptions of nature are naïve and original, and there is scarcely a trace of the influence of the antique in the productions of themselves or their contemporaries, notwithstanding that their superiority to any preceding artists is supposed to have been acquired only by the study of such ancient sculptures as were preserved in Pisa and elsewhere. The art inaugurated by the Pisani was further developed during the succeeding century by Andrea Pisano, the son of Ugolino, who executed in bronze the oldest door of the baptistery of St. John in Florence, by Andrea Orcagna, the Masucci, and others, whose genius was chiefly devoted to monumental sculpture and the execution of elaborate ornaments, bass-reliefs, and small figures on altars. Of the latter kind of work the altar in the chapel of San Michele in Florence, by Orcagna, is a celebrated specimen. Luca della Robbia, who died in 1442, is celebrated for his groups of the Virgin and Christ, and other sacred subjects, executed in terra cotta, and hardened by a peculiar process, the secret of which is said to have perished with him. At the close of the 14th century sculpture, under the influence given to modern art by Giotto, who in turn owed much to the example of Nicola Pisano, had attained a considerable degree of perfection; but with the commencement of the 15th it entered upon a grander epoch, the chief production of which was Lorenzo Ghiberti's celebrated bronze doors for the baptistery of St. John in Florence, which not only exceeded every previous effort of modern sculpture, but has remained to the present time a masterpiece of the art of bass-relief. Michel Angelo pronounced it "worthy to be the gate of Paradise." Among the competitors for the door of St. John were Donato di Betto Bardi, better known as Donatello, and Brunelleschi, called by the Italians Filippo di Brunellesco, both of whom were the friends and contemporaries of Ghiberti. Brunelleschi was most distinguished as an architect, but Donatello, by his noble statues of St. Mark and St. George, and other works distinguished by boldness of conception and vigorous execution, gained a foremost place among modern sculptors. Among other sculptors of the 15th century were Simon, the brother, and Giovanni di Pisa, one of the

many scholars of Donatello; the Pollajoli; Andrea Verocchio, at one time a painter and the master of Perugino and Leonardo da Vinci; and Andrea Ferrucci; all of whom were chiefly employed on sacred subjects for churches and convents. Toward the close of the 15th century sculpture, in common with the other arts, began to feel the influence of the newly awakened taste for the antique; and the religious subjects previously in vogue were succeeded by those suggested by classical history or mythology, the treatment being founded upon the ancient marbles and bronzes which the zeal of the Medici and other enlightened art patrons then first caused to be exhumed. But if the classical mode of representation was appropriate to purely classical subjects, and the study of the antique of advantage with respect to the technicalities of the art, the introduction of pagan forms and ideas into works of a purely Christian character was calculated to check the healthful development which art had already taken, and to weaken its influence in addressing modern sympathies. A pseudo-classical style, founded on mere imitation, uninspired by the sentiment which influenced the ancient artists, and irreconcilable with the spirit of the age, thenceforth made rapid innovations upon the practice of sculpture, and the art, while in the maturity of its promise, began to decline. It was at this period that the most extraordinary character in the history of modern art produced his masterpieces of form. The works of Michel Angelo Buonarrotti are beyond comparison the grandest efforts of modern plastic art, and his colossal Moses in the monument of Pope Julius II., his monumental statues of Lorenzo and Giuliano de' Medici, and his group called *La Pieta* in St. Peter's, show that the influences of the antique were unavailing to destroy his original conceptions of character and design. Grandeur and energy of expression and action were his chief characteristics, and his intimate knowledge of anatomy enabled him to follow the suggestions of his imagination to an extent attained by no other artist, and which was calculated to mislead or bewilder others brought under his influence, but destitute of his genius. He had numerous followers, whose works, for the most part mannered and exaggerated imitations of their master's style, are now forgotten. Contemporary artists of the 16th century were Jacopo Tatti, called Sansovino, of Venice, who had many eminent scholars; Pietro Torregiano; Baccio Bandinelli, who restored the right arm of the Laocöon; Benvenuto Cellini, equally distinguished as a sculptor and as a worker in the precious metals; Guglielmo della Porta, famous for his admirable restorations to the Farnese Hercules; and Giovanni di Bologna, sculptor of the celebrated "Rape of the Sabinés" and the bronze statue of Mercury at Florence; all of whom possessed great merit as sculptors, although their works are conceived after a lower ideal than those of the masters of

the previous century, and must be characterized both in sentiment and treatment as imitations of the antique. Profuse ornamentation, high finish, illusive effects, and great elaboration of details engaged the attention of the artist, and nobility of form or force of expression were lost in vain attempts to represent anatomical impossibilities. Giovanni Lorenzo Bernini, born in Naples in 1598, affords an example of this perversion of the principles of the art, and his works, notwithstanding the fertility of imagination and the executive ability which they display, are deservedly considered to violate taste and propriety. Alessandro Algardi, Francesco Mocchi, and other sculptors of the 17th century exhibited similar characteristics, although in occasional efforts they rose above the spirit of the age. Francesco di Quesnoy, called Il Fiammingo, deserves mention, however, as an artist of purer taste, who excelled in portraying children. Many other names might be cited of sculptors not inferior in separate qualities to the above; but it will be sufficient to observe that with the commencement of the 18th century sculpture in Italy had degenerated into a purely ornamental art, in which mechanical skill was more appreciated than taste or originality. In the latter half of the century the enlightened efforts of Popes Clement XIV. (Ganganelli) and Pius VI., and Cardinal Albani, the publications of Winckelmann, and the discovery of the buried treasures of Pompeii and Herculaneum, had the effect of reviving a love for the antique; and with the appearance of Canova (1757-1822) succeeded an era of purer taste. Some of the early works of Canova reflect the true spirit of the antique; but he subsequently cultivated a meretricious gracefulness of form, particularly in his female figures, with a frivolous and ignoble mannerism.—The history of modern Italian sculpture may be considered to describe in general terms the progress of the art in other European nations. In all of them it probably received its impulse from Italian artists, followed similar phases of improvement and decline, was influenced by similar fashions, and has been so slightly modified by national peculiarities or feelings as to render unnecessary any elaborate account of its progress out of Italy. That country is the school from which the principles of sculpture as recognized in modern times have emanated, and there may be said to be no other in existence. The chief masterpieces of ancient and modern art are still to be found there, and thither it is still the custom for sculptors, whatever may be their nationality, to resort for study or inspiration. In France the earliest names of note are Jacques d'Angoulême and Jean Goujon, who flourished in the 16th century. The florid style of Giovanni di Bologna was subsequently followed with considerable success, and in the reign of Louis XIV. Girardon and Puget were the precursors of a long line of sculptors, among whom were Falconnet, celebrated for his equestrian statue of Peter the

Great, Pigal, Houdon, Chaudet, Cartellier, and many other artists of merit. The chief names of the 19th century are David d'Angers, a great and original artist, Pradier, Étex, Desbœufs, Rude, Cavalier, Maindron, Bosio, Préault, and Clésinger. Sculpture in Spain has since the 16th century been identical or nearly so with that of Italy, except that it has been more exclusively devoted to religious purposes—a practice which led to the manufacture of images of sacred personages colored to represent life and habited in real drapery. The German sculptors subsequent to the 16th century have followed in the track of other nations, imparting to their works however somewhat of a peculiar local character. The principal names are Rauchmüller, Schlüter, Millich, Bartel, Nahl, Sonnenschein, Ohnmacht, and during the present century Schadow, Dannecker, Tieck, Zauner, Schwanthaler, Rauch, Kiss, Rietschel, Drake, Wagner, Max, Reiche, and Steinhäuser, most of whom have followed a style partaking of the qualities of modern romantic art and of the antique. Denmark has produced in Thorwaldsen an artist who co-operated with Canova in bringing back the severity and simplicity of antique art. Until the present century the art was pursued in England principally by foreigners, and the first native sculptor of note was Flaxman, a man of singularly pure ideal conceptions, and whose works bear a striking affinity to the antique. His designs from Homer are in this respect among the most remarkable productions of modern art. Other English sculptors of repute are Chantrey, Westmacott, Lough, Bailey, and Gibson. No American sculptures worthy of the name were produced previous to the time of Greenough; but within the last 25 years the works of Powers, Crawford, Brown, Clevenger, Rogers, Palmer, and others, have shown that American artists possess abilities in this department of art not inferior to those of their contemporaries.—The sculptured remains of Central and South America are, like those of eastern Asia and India, chiefly of value to the archæologist, and do not illustrate the progress of the art. They are distinguished by vastness of scale and a certain grotesque fancy, and in some instances by a beauty and symmetry of form remarkable in a primitive people. (See PALENQUE.)

SCUPPAUG, a spiny-rayed fish of the family *sparida* and genus *pagrus* (Cuv.); it is also called scup and porgy in some localities. In this family the gill covers are shining and scaly, and unarmed; the palate without teeth and the jaws not protractile; the spinous rays of the dorsal and anal fins bare, and received when depressed in grooves at their base; pectorals and ventrals sharp-pointed; branchiostegal rays 6; the scales large and thin, broader than long, the centre of growth being near the posterior border. In *pagrus* the molars are rounded and in 2 rows, and the front teeth conical with a villiform card-like band behind them. There are more than a dozen species in the

Mediterranean and Red seas, and the East Indian and S. Pacific archipelagoes. The common species on the American coast (*P. argyrops*, Cuv.) attains a length of 8 to 12 inches; when first taken from the water it is pinkish or flesh-colored above and silvery below; about the eyes reddish; a narrow green ridge at the base of the dorsal, and one just back of the eyes; iris mostly silvery; dorsal reddish, with the anterior rays silvery; the body is much compressed toward the back, which is high; the lips large and loose; caudal deeply forked; there is a large purple scale at the beginning of the lateral line. The food consists of cuttle fish, crustaceans, mollusks, and sea weeds, which are readily crushed with its powerful teeth. It is found from Massachusetts to South Carolina; it is common in Buzzard's bay and Vineyard sound, and is there used more than any other fish in a fresh state; it is caught with the hook from June 1 to the middle of October, and after that is netted or speared; of late years a few have been caught N. of Cape Cod, even as far as Nahant, probably the remnant of a considerable number thrown overboard near Boston harbor from 1832 to 1835; in the summer of 1859 a large specimen was taken in a net off the town of Lynn, Mass. In the autumn of 1859, in a single boat, 7 men employed in drawing a seine at Stone Bridge, not far from Providence, R. I., obtained 500 barrels of this fish at one haul, which were sold on the spot for \$500; and even larger hauls than this have been made, though not probably with more profit. The *P. vulgaris* (Cuv.) of the Mediterranean is about the same size, silvery, with reddish tinges or bars on the back; it was known as the *phagros* by Aristotle, and by ichthyologists was placed in the old genus *sparus* (Linn.) until separated by Cuvier; it is not found in northern waters, and its flesh is highly esteemed.

SCURVY. See ANTISCORBUTICS.

SCURVY GRASS (*cochlearia officinalis*, Linn.), a biennial, fleshy, smooth plant of the natural order *cruciferae*, indigenous to the sea coast of Europe. Its usual height is 6 to 7 inches; its stem is angular, leafy, and branching; its radical leaves reniform, subdentate, and spreading, furnished with long petioles; those of the upper part of the stem are alternate, sessile, or sheathing, oblong, sharply sinuate. The flowers, which are white and appear in April and May, grow in terminal corymbs, and are succeeded by globose, roughish silicles, each containing numerous seeds. The entire plant is antiscorbutic, aperient, diuretic, and stimulant, and is employed as a salad; its taste is bitter acrid; if bruised, it emits a pungent odor. When cultivated, its seeds should be sown in the autumn in a damp soil. There are several other species, all of similar value as remedial agents.

SCUTARI. I. (Turk. *Uskudar*; anc. *Chrysopolis*), a town of Asiatic Turkey, situated on the shore of the Bosphorus opposite Constanti-

nople, of which it is considered a suburb; pop. estimated at 60,000. It stands on the undulating slope of a hill, has 8 fine mosques, and a picturesque burying ground planted with cypresses, which is a favorite place of burial for wealthy families, from a tradition that the Mohammedans will eventually be expelled from Europe. The late sultan Mahmoud built extensive barracks at Scutari, which were occupied as a hospital during the Crimean war by the English. Scutari has a palace and a convent of howling dervishes. The surrounding country contains many beautiful villas and kiosks. The town is the great thoroughfare between the capital and the Asiatic provinces. II. (Albanian, *Skodra*; Turk. *Iskendërich*), a town of European Turkey, in N. Albania, situated on the river Boyana at the S. E. extremity of the lake of Scutari, 18 m. from the Adriatic coast; pop. estimated at 40,000. It is surrounded by walls and defended by two castles, has several mosques and churches, and is the see of both a Greek and a Roman Catholic bishop; about half the population belong to the latter faith, the remainder being Greeks and Turks. III. Or ZANTA (anc. *Palus Labeatis*), a lake of European Turkey, Albania, on the frontiers of Montenegro; extreme length 27 m., breadth from 5 to 10 m. It contains several small islands, 5 of which are inhabited. Several streams flow into it, the largest of which is the Boyana, which, having united with the Moratcha or Zanta, enters it from the N., and issues from its S. E. extremity, from whence it has a course to the sea of about 20 m., and is navigable for large boats as high as the town of Scutari.

SCYLLA. See SCIGLIO.

SCYTHE AND SICKLE, long knives with a curved edge, the former commonly used for mowing grass, bushes, &c., and the latter, called also a reaping hook, for cutting grain. These implements in ancient times were also employed as warlike weapons. In ancient Roman cameos they are depicted in the various forms in which they were employed under the general name of *fals*; as the *fals messoria*, the crooked sickle, such as is still used for reaping grain; *fals fanaria*, the long scythe for mowing grass, constructed with a handle at right angles to the blade, very much as at the present time; *fals vinatoria*, *arboraria*, *silvatica*, &c., the pruning knife, bill hook, bush scythe, &c. The implement was a symbol of Saturn, the *senex fulcifer*, personifying time, who cuts down and destroys all things as with a scythe. As a weapon the scythe was also made in several forms. The sword with the curved edge was the *falcatus ensis*; and in the shape of a short hooked knife, the handle terminating beyond in a dagger, it was made of convenient use for one hand, or attached to the end of a pole, making it then a sort of pike. In another form, which was used by the Assyrians, Medes, Persians, and the Gauls and Britons, the long crooked scythe blades were fastened to the

axles of their chariots or to the fellows of the wheels, and were thus made to cut down those among whom the chariots were driven. In modern warfare scythes have been used in close combat, and make a formidable weapon.—As agricultural instruments, there was little difference in the forms of the ancient scythes and sickles from those of the present time, and they appear from the representations of them to have been as well adapted for their uses as any made up to the 17th century. The same forms appear in the illustrations of Strutt in his "Manners and Customs of the People of England," and were there in use more than 10 centuries ago. The snath or handle was however straight instead of crooked, and was furnished with only one instead of two of the short handles which are inserted into the snath to take hold of. Among the earliest recorded improvements in their manufacture is the stiffening of the back edge by welding to it a strip of iron. This was also one of the earliest American mechanical inventions, being made by Joseph Jenks, a skilful iron manufacturer, who established iron works in 1646 on the Saugus river in Lynn, Mass., and in May, 1655, received from the legislature a special grant or patent running 7 years for this improvement. In the notices of early iron works in New England, scythes are generally named among the most important products. Among the manufacturers especially noted for this and similar productions was Hugh Orr, a Scotchman, who emigrated to Bridgewater, Mass., in 1788, and there built a shop for this particular branch. He soon added to it the manufacture of axes, and afterward introduced both in Rhode Island and Connecticut. His son Robert Orr established the present mode of forging scythes with the trip hammer, and was the first to make iron shovels in Massachusetts. The business has since been largely conducted in Sutton, Worcester co., and also in several towns in Maine and New York. It is however gradually disappearing before the introduction of mowing and reaping machines. In England the manufacture has been an important one for the last 800 years, and has been particularly successful in the N. extremity of Derbyshire, extending about 6 m. S. from Sheffield. It was established there by a party of Flemings who were driven from the Netherlands, the scythe makers among them settling in the parish of Norton and the sickle makers in the adjoining one of Eckington. The best of these tools are still made in this neighborhood, and in Bristol and Dudley. In the New York market only English sickles are found, and few of these are sold. They are distinguished from scythes by the crescent form of the blade, and their comparatively short length, about 8 feet, while that of the scythe is from 3 to 5 feet. When used, the sickle is held in the right hand, and the grain being gathered up with the left arm is clipped off. The scythe is always swung free with both hands. The edge of the sickle which

comes next the ground as it is held is bevelled off and notched over the face of the bevel like a file, giving to the implement a serrated edge. English scythes also are imported into the United States. They differ from those made in this country by their very thin flat web of cast steel, which, if relieved from the iron rib riveted along the back edge, might be rolled up like a ribbon, and would when released spring out straight again. It is tempered so as to take an edge like a razor. These scythes are fitted only for very smooth lawns.

SCYTHIA, in ancient geography, a vast area of indeterminate boundaries in eastern Europe and western Asia. The name was unknown to the native population, who, according to Herodotus, called themselves Scoloti. They are mentioned as Scythians by Hesiod, who describes them as living in wagons and feeding on mares' milk; and the same characteristics, but not the name, are given to them by Homer. Herodotus, the principal authority on the subject, describes Scythia as a square area, extending 4,000 stadia (nearly 500 miles) on every side, the southern boundary being the coast from the mouth of the Danube (not including the Tauric Chersonesus) to the sea of Azof (Niebuhr) or to the mouth of the Don (Rawlinson). On the N. were the nations called Agathyrsi, Neuri, Androphagi, and Melanchlæni. Much of his Scythian geography is founded on misconceptions, and is unintelligible, but it probably comprehended the whole region from the Danube and the mountains E. of Transylvania to the lower Don. Subsequently the Herodotean Scythia was conquered by the Sarmatians, who gave their name to it; and the Greeks, having become acquainted through the conquests of Alexander with Asiatic tribes beyond the Jihoon (Oxus) and the Sihon (Jaxartes), transferred the name of Scythia to their country; so that the Scythia of Ptolemy and of Roman writers under the empire is exclusively Asiatic, including all northern Asia from the Volga to Serica (China). It was divided by the Imaus mountains (the western part of the Himalaya with its offshoots) into *Scythia intra Imaum* and *Scythia extra Imaum*.—Herodotus, who visited the Greek settlements on the Euxine, and made inquiries both of Scythians and Greeks, gives a detailed account of the Scythian people, dominion, and manners of his time. They were nomadic tribes, living on food derived from animals, migrating according to the wants of their cattle, keeping large troops of horses, excelling in cavalry exercises and archery, and worshipping the sword, an elevated iron cimeter, as their chief divinity, to which they sacrificed sheep, horses, and a portion of the prisoners taken in war. Hippocrates, more precisely than Herodotus, describes their personal appearance as different from that of the rest of mankind, and like to nothing but itself. "Their bodies are gross and fleshy; the joints are loose and yielding; the belly flabby; they have but little

hair, and they all closely resemble one another." Among their barbarous rites were the following: The Scythian soldier drank the blood of the first man he overthrew in battle. The scalps and skins of slain enemies were preserved as martial decorations, and the skulls were formed into drinking cups. Once a year the chief of every horde filled a vast vat with wine, and divided it among the warriors in proportion to the number of enemies they had slain, those whose hands were unstained receiving none. They entombed their kings amid sacrifices of men and beasts, put out the eyes of all their slaves, gave credit to soothsayers, and had an extreme hatred of all foreign customs. Beside the nomadic hordes, forming the bulk of the population, to which the chiefs belonged, there were agricultural Scythians, with fixed abodes, raising and exporting corn and eating bread, who dwelt along the Dnieper (Borysthenes) and Bug (Hypanis), within the influence of the Greek settlements, and were probably regarded as degenerate brethren. Niebuhr supposes that they were a foreign race reduced to servitude. Repugnant from their habits and formidable from their force, with every man a practised horse-bowman, Thucydides declared that the Scythians would be irresistible if they could only unite.—Two principal events are recorded in their history. The successors of the Cimmerians in the order of migration westward, they drove the latter before them southward into Asia Minor, Ardys being then king of Lydia, and themselves invaded the Median empire, near the close of the 7th century B. C. Herodotus preserves the account of the poet Aristæas, that the Griffins of the extreme north initiated the migratory movement which finally expelled the Cimmerians from their territory, but heard himself another explanation, that the Scythians were driven across the Araxes and precipitated upon the Cimmerians in consequence of an unsuccessful war with the Massagætæ. The Scythian host pursued the fugitive tribes, but, mistaking the way, passed E. instead of W. of the Caucasus, and thus entered Media instead of Asia Minor. Niebuhr supposes, contrary to the Herodotean account, that the Cimmerians escaped into Asia Minor across the Thracian Bosphorus, and that their expulsion was not connected with the Scythian invasion of Media. The Median king Cyaxares was besieging Nineveh, but desisted in order to meet the unexpected inroad of the Scythians. He was completely defeated, and they became masters of the country, holding cruel and oppressive sway for 28 years as far as Palestine and the borders of Egypt. At length their chiefs were slain when intoxicated at a banquet, the hordes were expelled, and Cyaxares resumed the throne. The second event in Scythian history is the invasion by Darius (about 516-515 B. C.), undertaken to avenge their inroad upon Media. He summoned the whole force of his empire, and marched through Thrace with an army of

780,000 horse and foot, while a fleet of 604 vessels preceded him to the Danube and threw across a bridge of boats. Nothing further is certain except that he advanced into Scythia and retreated with severe loss. Ctesias says that after a 15 days' march he exchanged his bow for that of the Scythian king, and immediately fled on discovering the latter to be the larger. In the narrative of Herodotus, an army consisting chiefly of foot marches over about 12 degrees of longitude, in the face of enemies, across at least 6 large rivers, through a country without roads, and either devastated or uncultivated. There are constant skirmishes, but the Scythian king avoids a general engagement, and sends to Darius the symbolical present of a bird, a mouse, a frog, and 5 arrows. At length the Persians begin a rapid retreat, but the Scythians reach the bridge on the Danube before them, which was saved only by a stratagem of the Ionians; and Darius was thus able to return to Asia. When Alexander crossed the Danube, it was not nominally an invasion of Scythia, which term was then limited to the country of northern nomadic nations that were not Sarmatian, and in the time of Ptolemy was applied only to the scarcely known northern regions of Asia. The Romans had marvellous narratives, but little knowledge, concerning the inhabitants of this immense territory.—Niebuhr, Böckh, Schaffarik, Thirlwall, and Grote maintain that the Scythians of Herodotus were of the Mongolian race, the prototypes of the Huns, Bulgarians, and Turks of later centuries. Humboldt, Klaproth, Grimm, Donaldson, and Rawlinson controvert this opinion, and consider them to belong to the Indo-European race. The analogy of physiological characteristics or of manners and customs is less decisive than that of language; and, according to Rawlinson, of the small number of Scythic words which remain, nearly all present roots capable of identification with well known Indo-European terms.—See Niebuhr, *Kleine Schriften*; and Rawlinson's "Herodotus," vol. iii. (1860).

SEA. See OCEAN.

SEA ANEMONE. See ACTINIA.

SEA BEAR. See SEAL.

SEA OAT, the common name of the cartilaginous fishes of the order *holocephala* and family *chimæroidei*. They seem to form a group intermediate between the sturgeons and sharks; the dorsal cord is continuous, with cartilaginous neural arches and transverse processes; the skull is short and rounded, produced on each side into a process to which the lower jaw is connected instead of to an *os quadratum*; the upper jaw and palate are fused with the skull, without traces of suture; the upper jaw has 4 broad plates or teeth, and the lower 2; the eyes very large and without lids; nasal cavities very large and convoluted, opening on the under side of the snout in front of the mouth, which is small; the branchiæ are not fixed by their outer margin, and are covered by a small



operculum, adhering to the hyoid arch, with only a single aperture on each side behind the head, communicating interiorly with 5 branchial sacs opening separately into the pharynx; there is no air bladder, and the intestine has a spiral valve. The skin is covered with placoid granules; between the eyes is a fleshy club-shaped process, with serrated edge and ending in a spine, which somewhat resembles a crown, and has given rise to one of its popular names, "the king of the herrings," though in this as in many other instances the monarch preys upon his subjects. The ventrals are abdominal, the anal small, the pectorals powerful, and the tail heterocercal; the anterior dorsal is short, triangular, with a strong spine for the first ray, and is placed over the pectorals. They are oviparous, the large eggs being enclosed in a leathery capsule; the males are provided with trifid claspers. Linnæus gave the name of *chimæridæ* to the family from their singular appearance, as they at first sight, and in ill stuffed specimens, presented to him a seeming union of parts of different animals and of contradictory characters.—The northern sea cat (*chimæra monstroa*, Linn.) has a conical snout, the dorsals contiguous and reaching to the end of the tail, which is prolonged into a slender filament; the body is elongated and shark-like; the eyes have a greenish pupil surrounded by a white iris, and they shine, especially at night, like cats' eyes, whence the common name; the color is silvery with brown spots; the tail is nearly as long as the body. It attains a length of 8 or 4 feet, and is found in the North sea and northern Atlantic, where it pursues the shoals of herring and other migratory fish; it also feeds on jelly fishes and crustaceans; it has been taken on the coasts of Great Britain. The flesh is tough, but the Norwegians make use of the eggs as food; the oil of the liver is employed by them in diseases of the eyes and for wounds, and the end of the tail for pipe pickers.—The southern sea cat belongs to the genus *callorhynchus* (Gronov.), and is the *C. australis* (Gronov.); the snout ends in a gristly appendage, bent backward at the end so as to resemble a hoe; the anterior dorsal is very far forward over the pectorals, the 2d over the ventrals and reaching to the caudal, and the tail does not end in a filament; it is of about the same size as the northern animal, and silvery, tinged with yellowish brown; it inhabits the southern seas, and, like the other, in very deep water.

SEA COW. See MANATEE.

SEA CUCUMBER, one of the popular names of the *holothuria*, the highest order of the echinoderms, which are the highest class of radiated animals; the name is derived from their generally elongated and more or less cylindrical and warty form; they are also called sea slugs from their vermicular mode of creeping. The body has not the calcareous covering of the star fishes and sea urchins, but is rather soft, with a leathery skin sometimes furnished with calcareous plates or granules without

spines; the mouth is at one end and the cloacal opening at the other, the former surrounded by branching and retractile tentacles supported on an osseous ring which forms the rudiment of an internal skeleton; the ambulacra (feet) or suckers are arranged usually in longitudinal rows on the sides of the body, alternating with spaces having no such apparatus, and corresponding to the spiny rows of star fishes and sea urchins; motion is effected principally by these suckers, the mouth forward. By the introduction or ejection of water at the posterior extremity the body may be made to assume great variations in length and width, and the general appearance externally is more that of an annelid than a radiate. Some of the genera (as *synapta*) have cutaneous anchor-like hooks by which they attach themselves, each inserted obliquely under a small subcutaneous scale perforated by a canal; the muscular layer under the skin is very thick, and so powerful in its constrictions that the animal can discharge all its viscera through the mouth, this operation perhaps in some cases depending partly on the sudden change of pressure when the specimen is quickly taken from a great depth. They have a well developed œsophageal ring, which sends off nerves to the body and tentacles; the intestinal canal is very long, retained in place by a kind of membranous mesentery, and generally unsymmetrical; they have a distinct vascular system, but no heart; the tubes for the water for respiration are much branched, and open from the cloaca; respiration is also effected partly by the tentacles around the mouth, which communicate with the aquiferous system, and by the water introduced into the visceral cavity. The ambulatory organs or feet are arranged either in 5 rows as on the ribs of a melon, or only on the lower surface, or on a kind of ventral disk; their motions at the bottom of the sea are aided also by the oral prehensile tentacles. The sexes are distinct; some multiply by fissuration, but most by means of eggs; in the first form the young has an oval ciliated body, like an infusorial animalcule, without external organs or distinction of parts; in the next larval change the organs are developed, at first in a bilateral manner (according to Müller), and then pass into the radiated type by a process of internal gemmation, receiving new locomotive organs in the ciliated fringe as they pass into the pupa form, from which the true echinoderm is developed.—The old genus *holothuria* (Linn.) has been variously subdivided by modern authors, whose names even cannot be introduced here. They are generally small on the New England coast, but attain a large size in the bay of Fundy and on the banks of Newfoundland; on the mud flats of the Florida reefs they are sometimes seen more than a foot long and 3 or 4 inches in circumference. All along the American coast is found the *sclero-dactyla Briareus* (Ayres), from 3 to 6 inches long, of a dark brown color, with 10 very

branching tentacles; it lives on muddy bottoms in shallow water among the roots of *zostera*. The *Cuvieria Fabricii* (Dub. and Kor.; *H. squamata*, Fabr.) is about 8 inches long, of a bright brick-red, the color being readily imparted to alcohol and even to water; it is scaled and granulated above, and has 10 tentacles; it is generally caught on hooks, and occurs on the coast of New England. The *chirodota arenata* (Gould) is 5 to 6 inches long, club-shaped, ending posteriorly in a tube about the size of a crow quill; the color is light drab, with calcareous granules; it is found on our beaches after storms, and lives in shallow water. The *botryodactyla grandis* (Ayres) is very abundant in the bay of Fundy and on the banks of Newfoundland, and attains a length of 6 to 8 inches; when boiled it is very palatable, and no doubt could be made as important an article of trade as the tripang of the East Indies. The breeding season on our coast seems to be the winter and spring. The quinary arrangement prevails among holothurians as among other echinoderms. For a description of the 8 genera and 13 species of the American coast, all of which are different from those of Europe, see "Proceedings of the Boston Society of Natural History," vol. iv. (1851-'2), where Dr. W. O. Ayres has carefully compared them.—Among the European species may be mentioned the *H. (psolus) phantapus* (Linn.), with an almost scaly envelope, and the feet of its central disk arranged in 8 series; the *H. squamata* (Fabr.), a small species, with the lower surface flat and soft with a great number of feet, and rough and scaly above; and the *H. tremula* (Gmel.), of the Mediterranean, blackish, bristled above, with numerous feet below, and 20 branched tentacles. The last named grows to a foot in length, and is one of the species eaten by the Italian fishermen. These animals were called by the ancient writers *purgamenta maris* and *pudenda marina*; their food consists of marine creatures, and sometimes very solid ones, as their powerful oral apparatus would indicate. Several species of holothurians are collected in the East Indies for food, under the name of *bêche de mer* or *tripang*, whose taking and preparation employ great numbers of the Malays and Polynesians; the best are found on reefs of mixed coral and sand in the Feejee group in 1 or 2 fathoms of water, and are obtained by diving; they are purchased in the fresh state of the natives for various articles of use or ornament, are first boiled in their own liquid, and are then dried on stages in large houses heated by fires. They meet with a ready sale in the Chinese markets as ingredients for rich soups, bringing from 10 to 50 cts. a pound (\$13 to \$60 a picul of 133½ lbs.), according to quality. For an account of the mode of preparation, see vol. iii. of the "Narrative of the U. S. Exploring Expedition" under Capt. Wilkes, pp. 218-222, with a plate.—From researches made on our coast it appears that the laminarian zone just

below low water mark is the favorite residence of holothurians, though a few occur in deep water; *synapta* is found from low water mark to 6 or 7 fathoms, *sclerodactyla* and *chirodota* in very shoal places, *Cuvieria* and *psolus* in little deeper; the latter even to 18 fathoms, and *botryodactyla* and *stereoderma* in 80 to 50 fathoms on the banks of Newfoundland. Those found in shallow water are the most common on our coast. The *echini* live in deeper water, and the star fishes are the lowest both in habitat and in the radiated scale.

SEA DEVIL. See GOOSE FISH.

SEA EGG. See ECHINUS.

SEA ELEPHANT. See SEAL.

SEA FOX. See SHARK.

SEA HOG. See PORPOISE.

SEA HORSE, an osseous fish of the order lophobranchs (with tufted gills), of the family of pipe fishes, and of the genus *hippocampus* (Cuv.). The ordinal and family characters have been described in the articles LOPHOBRANCHS and PIPE FISH. In the present genus, which includes several species, the snout is prolonged and the head elevated posteriorly, somewhat resembling a miniature horse's head, the ears being represented by a spiny coronet on the occiput; the orbits, pectoral ring, and the other rings of the mailed body are more or less spiny; the tail is without a fin and prehensile, and by means of it they suspend themselves to sea weeds and other submarine objects; the eyes are prominent, and can be moved independently of each other and in opposite directions; the pouch in which the males carry the eggs till they are hatched opens at the commencement of the tail; the ventrals are absent, and the pectorals very small and just behind the head; there is a single short dorsal on the middle of the back, whose edge has a spiral motion; the females have a small anal, which is absent in the males; the mouth is terminal and without teeth. They inhabit all parts of the temperate and especially of the tropical oceans; the food consists of minute marine animals, especially ova; a kind of hibernation has been observed in the Mediterranean species by Rusconi; they swim vertically, with the tail ready to wind instantly around any object they meet, from which to watch and seize their tiny prey. There is one species in the British seas, the *H. brevisrostris* (Cuv.), 6 inches or more in length, with much compressed, short, and deep body, divided by longitudinal and transverse ridges, with tubercles at the line of intersection; the snout is comparatively short; it can climb up the weeds, raising the body by means of the spines of the cheeks and chin; the color is pale ashy brown, with iridescent tints about the head. De Kay describes the *H. Hudsonius*, 3 to 6 inches long, from the coast of S. New England and New York; it is of a yellowish brown color, with 12 rings in the body and 36 in the tail. Other species are found in the Mediterranean, and more abundantly in the East Indies. Their spiny armor protects them from preda-

ceous animals and from injury by the rocks among which they delight to dwell.

SEA HORSE. See WALEUS.

SEA LEOPARD. See SEAL.

SEA LION. See SEAL.

SEA NETTLE. See ACALEPHÆ, and JELLY FISH.

SEA PIE. See OYSTER CATCHER.

SEA PORCUPINE, a common name of the osseous fishes of the order *plectognathi* (with comb-like gills), family *diodontidae* or gymnodonts, and genera *diodon*, *tetraodon*, &c., so called from the spines with which the body is studded. This order which contains the sun fish, trunk fish (described hereafter), and file fish, has the internal skeleton partly ossified, and the skin covered with ganoid scales or spines; the maxillaries and intermaxillaries are wholly or in part united, and the upper jaw is in most immovably fixed to the cranium; there are no pancreatic cæca, no well developed ventrals, no duct to the air bladder, and only vestiges of ribs. In the family of gymnodonts the teeth are incorporated with the bone of the jaws, and resemble a parrot's beak with or without mesial division, their plates consisting of hard dentine adapted for bruising and cutting the crustaceans, mollusks, and sea weeds upon which they feed. The skin is thick, leathery, and armed with spines which stand out in every direction, like the quills of a porcupine or the prickles of a chestnut burr, when the body is inflated by filling with air the stomach, or more properly a large sac beneath this organ communicating with the œsophagus; the air is forced into this sac by swallowing; when thus distended the fish loses all command over its fins, and rolls over belly upward, floating at the mercy of the wind and waves; as it is a considerable time before the air can be sufficiently expelled to allow the fish to resume the full control of its movements, many are caught in this helpless condition; they emit a blowing sound when taken, from the expulsion of the air; the tail is short, and feeble as a locomotive organ; the spinal cord, according to Owen, is very short. Some of the family have no external openings to the nostrils, the nerve of smell being expanded on cutaneous tentacles. Their flesh is useless as food, and in some is poisonous. They are very tenacious of life, on account of the small size of the gill openings, and have a disagreeable odor which is retained even in alcohol for years; they are mostly inhabitants of tropical seas, and of moderate size, rarely more than 2 feet in length, with the diameter of the inflated body more than half of this.—In the genus *diodon* (Linn.) there is no mesial division of the jaws, and the teeth are apparently only 2; the spines are long, thin, sharp, with 2 root-like processes, and capable of erection. There are 9 species, of which 3 are described by Mitchill as occurring on the coasts of the United States, under the name of balloon fishes; these are the *D. maculo-striatus*, about 6 inches long, greenish spotted and striped with dark; the *D. pilo-*

*sus*, smaller, with most of the body furnished with soft, flexible bristles of a golden color; and the *D. verrucosus*, with a warty and spiny skin. The atinga (*D. hystrix*, Bl.), of the East Indian, S. African, and South American coasts, is the best known to seamen; it is caught in nets or on hooks, and is very difficult to handle from the sudden erection of the spines and the active motions of the body.—In *tetraodon* (Linn.) there is a mesial suture in the jaws, so that there appear to be 2 teeth above and 2 below; the spines are very short, and the head, back, and tail are generally smooth. The *T. electricus* (Paterson), with electric properties, has the skin entirely smooth. (See ELECTRIC FISHES.) The *T. Pennantii* (Yarr.), 1½ feet long, has been caught on the coast of Cornwall; it is blue above, silvery white on the sides and below, with fins and tail brown; the abdomen only is covered with spines. There are several species on the American coast, of which the most common is *T. turgidus* (Mitch.), 6 to 14 inches long, olive-green above and whitish below; the abdomen lax, covered with prickles and capable of considerable distention; it is not uncommon about Martha's Vineyard, and on the Massachusetts and New York coasts, where it goes by the names of puffer and swell fish. Other names for this and the preceding genus are globe fish, urohin fish, and spine-belly.

SEA RAVEN, an acanthopterous fish of the bullhead or sculpin family, and genus *hemitripterus* (Cuv.), one of the ugliest of this ugly group. The head is flattened, rough, and spiny; the pectorals are large and wing-like, advancing far under the throat, and with no free rays; ventrals under the pectorals, consisting of a spine and 3 or 4 soft rays; the 1st dorsal deeply notched, and all the fin rays simple; the head and jaws are furnished with numerous cutaneous branching filaments, which with the spines and huge mouth render the physiognomy of the fish any thing but pleasing; there are sharp, card-like teeth on the jaws, vomer, palate, and pharyngeal bones; the tongue is smooth, the branchiostegal rays 6, and the body without scales. The typical species is the common sea raven (*H. Acadianus*, Storer), called also the Acadian bullhead and deep water sculpin; it attains a length of 2 feet and a weight of 4 or 5 lbs. The colors vary exceedingly, presenting every shade of dark brown, blood red, pinkish purple, and yellowish brown, with various markings and bands; yellowish white below. The form is sculpin-like; the head is large, about ¼ of the whole length, with enormous gape and hideous appearance; the whole body above the lateral line is granulated, and thickly studded with tubercles; the 1st 3 rays of the 1st dorsal are longest, and with the other rays of this fin are fringed at the end. It is not unfrequently taken on hooks by cod fishermen in deep water around the ledges of Massachusetts bay, in Nova Scotia, the gulf of St. Lawrence, and the New England and New York coasts. Like the land raven, it is omniv-

orous and voracious, acting the part of a useful scavenger in removing decaying matters.

SEA ROBIN. See GURNARD.

SEA SERPENT, a marine animal, by some considered fabulous, and by others a verity, said to inhabit chiefly the northern seas, especially about the coasts of Norway and New England. It is important to observe that the idea of a sea serpent certainly originated in northern Europe, and was clearly mythological in its first conception. The Midgard serpent, offspring of Loki, which girds the world in its folds and inhabits the deep ocean till the "twilight of the gods," when it and Thor will kill each other, plays a conspicuous part in the Edda; and the gradual degradation of the idea from mythology to natural history in its native seats may be traced in Olaus Magnus and the later sagas, till the Latin of Pontoppidan gave it currency in Europe with the natural additions of popular fancy.—Though hundreds of witnesses of unimpeachable veracity and of intelligence aver that they have seen this animal, all the researches of naturalists have failed to discover any certain traces of its existence or indications of its nature. For an account of its visits to Norway the reader may consult Pontoppidan's "Natural History of Norway," (fol., London, 1755), and vol. viii. of the "Naturalist's Library" (Edinburgh, 1811); and for its occurrence on the American coast, vols. ii., xi., xii., and xxviii. of the "American Journal of Science," the "Report of the Committee of the Linnean Society of New England" (Boston, 1817), Sir Charles Lyell's "Second Visit to the United States" (London, 1850), and Gosse's "Romance of Natural History" (London, 1861). On one side there is an array of testimony which would be fully trusted under ordinary circumstances, and on the other a theoretic or supposed impossibility. Among those who disbelieve in its existence is Prof. Richard Owen, who considers the negative evidence from the utter absence of any remains as stronger against its actual existence than the positive statements of alleged witnesses. Various have been the objects which it is said have been mistaken for a sea serpent; such are large pieces of sea weed floating with a head-like root projecting above the surface, a shoal of 50 or 60 porpoises tumbling one behind the other, a pair of long-bodied sharks, a large horse-mackerel or tunny, some species of large whale, or a large seal alone or accompanied by a shoal of porpoises. This animal is said to appear in calm weather, with the general form of a serpent, a slender body from 60 to 100 feet long, a broad snake-like head as large as that of a horse, large eyes, and a long and narrow neck, and of a general dark brown color; some describe it as having fins and others not, which might depend on the portion of the body above water. It is seen swimming at the surface, with the head and neck elevated, progressing swiftly, apparently by a vertical undulating motion. There does not seem to be any fish to

which this animal can be referred; the marine serpents of the Indian and Pacific oceans, the *hydrophidæ*, do not attain a length of more than 4 or 5 feet, and have never been met with in northern waters; an anaconda carried from a South American river by the Gulf stream to the north would be out of the question; a lengthened cylindrical form is no more in favor of a serpent than of a fish or cetacean. Prof. Owen thinks that navigators have been deceived by a large seal; but the size of the creature and the portion elevated above water would seem to render such a mistake, to persons accustomed to the sight of seals and other objects at sea, impossible. Many fossil types of animals have been transmitted, with or without interruption, from remote geological epochs to the present time; among these may be mentioned the Port Jackson shark (*centracion*), gar pike (*lepidosteus*), which have come down to us without interruption, and the *chimaera*, *percopsis* of Lake Superior, and soft-shelled tortoises (*trionychidæ*), with more or less apparent disappearance. About 20 years ago it was suggested that the closest affinities of the sea serpent are with the marine lizards or enaliosaurians of the secondary age, and especially with the plesiosaurus. (See PLESIOSAURUS.) On the above principle it is maintained that the enaliosaurians, found in the secondary, may have disappeared, actually or apparently, in the tertiary, to reappear at the present time. This is also the opinion of Prof. Agassiz, as given in the report of his lectures in Philadelphia in 1849. As to the argument of Owen, drawn from the absence of remains in the tertiary or present ages, it must be remembered that we rarely find the remains of many animals which are now very much more common than the sea serpent is believed to be, as for instance the seals and whales (except where they are hunted by man), the beaver, the cougar, and the otter. Mr. Gosse has collected from various sources the arguments showing that the non-occurrence of dead animals is of little weight as disproving the existence of the sea serpent; its carcass would float only a short time, and the rock-bound coasts of Norway would be very unlikely to retain any fragment cast up by the waves; many whales are known to naturalists only from 2 or 3 specimens in as many centuries.—There is a mammalian type of the tertiary epoch, coming near to the cetaceans and in some respects to the seals, which may present some claim to be the animal now known as the sea serpent, and this is the *zeuglodon*. There is no reason, *a priori*, why a slender and lengthened form should not exist among living cetaceans, and it is well known that the marine saurians of the secondary have been replaced by the marine mammals of the tertiary and present epochs. See ZEUGLODON for a description of this animal. It need only be said here that, though it probably bore but little resemblance to a snake, it would answer well most of the requirements of the sea

serpent as described. The conclusion of the best naturalists at present is that the existence of the sea serpent is possibly a verity which will yet come under scientific examination; and that it may prove to be some modified type of the secondary enaliosaurians, or possibly some form intermediate between them and the elongated cetaceans. As the ichthyosaurus was replaced by the whale-like cetaceans, so the plesiosaurus may have been by the zeuglodont cetaceans, of which the sea serpent may prove to be a more or less modified form.

SEA SNIPE. See PIPE FISH.

SEA SWALLOW. See TEEN.

SEA UNICORN. See NARWHAL.

SEA UROHIN. See ECHINUS.

SEA WOLF. See WOLF FISH.

SEABURY, SAMUEL, D.D., an American clergyman, bishop of the Protestant Episcopal church in Connecticut, born in Groton, Conn., Nov. 30, 1729, died Feb. 25, 1796. He was graduated at Yale college in 1748, and went to Scotland to study medicine in 1751; but he afterward studied theology, and was ordained by Bishop Sherlock of London in 1753. On his return home he became rector of Christ's church, New Brunswick, N. J.; in 1757 he removed to Grace church, Jamaica, L. I., and in 1766 to St. Peter's, Westchester, N. Y. During most of the war of the revolution he resided in the city of New York, being a royalist. Having been chosen by the clergy of Connecticut for their bishop, April 21, 1783, he was consecrated at Aberdeen, Nov. 14, 1784, by the Scottish primus, Bishop Kilgour, and on his return was chosen rector of St. James's church, New London, where he resided during the remainder of his life. He took part in revising the prayer book and framing the constitution of the church which was adopted in 1789. Three volumes of his sermons were published in 1791-'8.—SAMUEL, D.D., an American clergyman, grandson of the preceding, born June 9, 1801. He was ordained deacon by Bishop Hobart, April 12, 1826, and priest July 7, 1828. He was missionary for a time at Huntington and Oyster Bay, L. I., whence he removed to Hallett's Cove (now Astoria), where St. George's church was founded by him. In 1830 he became a teacher in the Flushing institute; and in 1834 he removed to New York to take charge of "The Churchman" newspaper. Under Dr. Seabury's editorial care this journal attained a powerful influence in the Episcopal church, particularly in connection with the subjects so keenly disputed in that church respecting the Oxford tracts and kindred matters. In 1849 he retired from "The Churchman," and has since been occupied in his parochial duties as rector of the church of the Annunciation in New York. He has published "The Continuity of the Church of England in the 16th Century" (New York, 1853), "American Slavery Justified" (1861), and other works, beside a number of occasional sermons and addresses, of which the sermon preached at the

funeral of Bishop B. T. Onderdonk (May 7, 1861) is the most recent.

SEAL (Ang. Sax. *seol*), an aquatic carnivorous mammal, the type of the family *phocina*, constituting the old genus *phoca* (Linn.), which has been variously subdivided by modern naturalists. The group of seals is at once distinguishable from other mammals by the structure and arrangement of the limbs; the toes of all the feet are included almost to the end in a common integument, converting them into broad fins, the bones being to a great extent within the skin of the trunk, and the tips armed with strong non-retractile claws; the hind feet are thrown out backward from the posterior part of the body, nearly horizontally, the very short tail being between them, and are the principal agents in swimming and diving; the fore paws when swimming are applied close to the body, and are used only in turning about. Though formed on the general model of other mammals, there are very interesting modifications to fit them for aquatic life; the body is cylindrical, tapering gradually backward; the head is small and rounded, and the neck short; the skin has an under woolly down, over which is a covering of long, smooth, and shining hairs, shedding water by an oily secretion, and offering no resistance in swimming; between the skin and muscles is a layer of fat, as in cetaceans, giving that plumpness to the body expressed in the common saying "as fat as a seal." The skull is thin, which renders the head light in the water, in the smaller species without the crests for muscular origins usually seen in carnivora; the face short and broad; zygomatic arches perfect and strong; anterior nasal opening not terminal, and in some directed almost vertically for facilitating respiration when the animal comes to the surface; the tentorium separating the cerebrum and cerebellum is formed wholly from the occipital bone; the orbits are continuous with the temporal fossæ, and the skull is very narrow between them, the cranial cavity seeming like a box shut off from the facial portion of the head; the lower part of the occipital bone is broad and thin, with an oval opening in the young in front of the great foramen covered with membrane, but closed by bone in the adults, and the condyles are much larger than in other carnivora; the infraorbital foramina are very large, for the exit of the branch of the 5th pair of nerves which supplies the sensitive whiskers; the nasal bones are very short. The incisor teeth are small and pointed, the canines not generally very projecting, but much worn, and the molars with laterally compressed crowns, sharp cutting edges, many-pointed, and usually single-rooted; the number varies in the different genera. The cervical vertebræ are short, the dorsals and pairs of ribs 15, and the lumbar 5 (in the common seal), the caudals very imperfectly developed, the anterior portion of the sternum prolonged far up the neck and mov-

able, the scapula small with a moderate and nearly central spine, and the coracoid and clavicles absent; the bones of the forearm short, wide, and flattened; the femur at a right angle with the spine and the leg, very short and comparatively immovable, giving greater freedom of motion to the rest of the limb; tibia and fibula long and flat, the former with a double curvature; metatarsal bones and toes long and slender, and the foot wide and paddle-like. The mouth has thick fleshy lips, with many long, knotted, and exceedingly sensitive bristly whiskers with nerves from the 5th pair; the tongue rough and bifurcated at the end; nostrils capable of being completely closed under water; external ears in most merely small valves which close the auditory opening; the eyes (with nictitating membrane) large, full, bright, and expressive of great intelligence; brain of large size, and with many convolutions; mammae 2 or 4, ventral, near the umbilicus, enclosed in folds of the skin; the intestinal canal is very long for a carnivorous animal; the posterior vena cava, close to the liver, has a large sac or sinus which receives 5 hepatic veins, serving to retain a portion of the blood from the heart while the animal is under water; the *foramen ovale* in the heart and the *ductus arteriosus* are often found pervious; the stomach is elongated, and has a villous coat; the right lung is 2-lobed, and the left undivided; the kidneys are divided each into 120 to 140 parts like a bunch of grapes, as in the human foetus, bears, otters, cetaceans, the elephant, and ox; the testes are permanently retained within the abdomen. The crystalline lens is more spherical than in land animals, and the sclerotic very thick in front and behind, and thin in the middle, allowing a change of its antero-posterior diameter by compression of the muscles to suit aquatic and aerial vision; the tapetum is remarkably brilliant. Their habits are much the same in all the species; they live in the arctic and antarctic seas, near the coasts, and often at the mouths of rivers, preying upon migratory and other fish, crustaceans, and cephalopod mollusks; according to Pallas they are found in the Caspian sea, Lake Baikal, and other inland waters having no direct communication with the ocean. They are gregarious and migratory, fond of particular spots, leaving the coldest arctic regions in winter for milder seas; the herds are usually of the same species, or when different each species keeps by itself, rarely fighting with the others. Most are polygamous, each male having 3 or 4 females, forming small families; gestation lasts 9 or 10 months, and 1 or 2 young are born at a time, which are tenderly cared for; parturition and lactation occupy 2 or 3 months, in autumn, winter, or spring, which are passed on shore, the food being such as can be picked up on land or near the coasts, even from the vegetable kingdom, both sexes at this time growing very lean. They are fond of crawling out of water upon rocks, beaches, and ice floes, for the

purpose of basking in the sun, always keeping a good lookout, and plunging into the water at the approach of an enemy; they never go far from their favorite element. They are playful, but at times fight fiercely, as in the breeding season; their bite is severe, and the wounds made by their teeth are not disposed to heal readily either on their own or the human body; some of the larger species are very powerful, and often dangerous when wounded. The voice is a kind of snapping bark, which, with their canine expression of face, has given them the name of sea dogs. They can remain under water 15 or 20 minutes, and even longer; the interval between the inspirations when quiet is from  $\frac{1}{2}$  to 1 minute, and the nostrils are habitually closed except during the respiratory act; they take in and expire a large quantity of air at a time, and their animal heat is among the highest found in mammals. They swim with considerable speed, and are most expert divers; their movements on land are awkward and laborious, consisting of a series of short jerking leaps forward by means of the powerful muscles of the back, assisting themselves occasionally, as in climbing rocks and ice, by the anterior limbs; they can advance more rapidly on the ice, by a vertical motion of the spine, somewhat in the manner of a caterpillar, rendered possible by the short spinous processes, large and elastic intervertebral cartilages, and the uncommonly strong spinal muscles. The sense of smell is very acute, as would be indicated by the numerous plates of the turbinated bones; the sight is also acute, and best in a feeble light, fitting them for the comparative darkness of the arctic winter and the polar seas; the hearing is believed to be excellent both in the water and on land. They seem to have a natural confidence in man, though he shamefully abuses it for his profit and their destruction; they are easily tamed, affectionate, and docile; at zoological gardens they are taught to sit erect on the lower part of the body and the hind limbs, to bow, kiss the hand, pretend to be asleep and to snore, turn the crank of an organ (though without much regard to time), shoulder a gun, shake hands, and perform other similar simple tricks, for the reward of a morsel of fish; they are very inquisitive, and are said to be fond of music; if persecuted they soon learn to fear and avoid man, and generally take care not to be surprised by the polar bear; in captivity they are much disposed to be drowsy and almost lethargic. Seals have been known from the earliest antiquity, and may have given rise to the poetic fables of tritons, sirens, nereids, mermaids, and mermen, and other attendants of the Neptune of classical mythology. There are few animals more tenacious of life than seals, and the most needless and horrible cruelties used to be practised in their capture; now the larger species are generally killed at once with the lance thrust into the heart, and the smaller ones are stunned by a blow on the nose from a long-

handled hammer made for the purpose, with a sharp spike on the opposite side to hook into the skull. The Esquimaux hunt them in light boats with lances, or spear them at holes in the ice where they come up to breathe; to them the seal supplies food, oil for light and warmth, skins for clothes, boots, utensils, tents, and boats, sinews for thread and lines, and membranes for under garments and window coverings; it is to them as important as sheep and cattle to us, the reindeer to the Laplander, or the palm to the Pacific islander; as Dr. Hamilton says: "The sea is their corn field, and the seal fishery their most copious harvest," and to reap this are directed all their education and energies. The oil is of superior quality, and, if prepared from the fresh animals, is transparent, free from odor, and not unpleasant to the taste; the skin, by a peculiar process of Esquimaux tanning, makes a water-proof leather.—As articles of commerce seal skins are of two kinds, hair skins and fur skins; the former are used for making garments, the latter, chiefly from the south seas, for finer purposes like that of the bear; all seal skins, however, have a mixture of coarse hairs and finer fur. Millions of skins have been used in Europe and in this country, and thousands of tons of shipping are employed in their capture; beside the profit of the fishery, it is of national importance as a school for bold, hardy, and practical seamen, which renders efficient both the naval and mercantile marine; off the coasts of Labrador, hundreds of thousands of skins are or were taken annually, amid much peril and privation. Large herds of seals of various species, especially the Greenland and hooded seals, are found on fields of floating ice, called seal meadows; on these the hunters try to surprise them when sleeping, killing the young with clubs and shooting the resisting adults. The seal fishery is extensively carried on from Newfoundland, in schooners of about 80 tons each, with a crew of 25 or 30 men; the number of skins exported from this island, between 1838 and 1848, varied from 400,000 to nearly 700,000 annually; in 1847, 321 vessels from this neighborhood, numbering 30,000 tons and employing nearly 10,000 men, were engaged in the fishery in the northern ocean; many seals are also taken in early spring at the Magdalen islands and on the Labrador coast among the floating ice, and also by nets set across narrow channels. It is but little if at all pursued in New Brunswick, though it would doubtless be profitable. Beside man, the seal has to guard against bears on land and on the ice, and against sharks and carnivorous cetaceans in the water.—In the genus *phoca*, as restricted by modern naturalists, the dental formula is: incisors  $\frac{3}{3}$ , canines  $\frac{1}{1}$ , and molars  $\frac{2}{2}$  = 32; the molars have 3 or 4 triangular cusps, all except the 1st with double roots, and placed in an oblique position along the jaw; the posterior margin of the palate is acutely and deeply notched, and the palatal foramen is on the maxillary bone. The group to which

the common seal belongs was named *collocephalus* by F. Cuvier, on account of the fine shape and large size of the cranium and the shortness of the face; the brain is nearly as large as that of the most intelligent monkeys. This species—the *P. (C.) vitulina* (Linn.), the *phoque commun* and *veau marin* of the French, the *Seehund* of the Germans—attains a length of 4 to 6 feet; the color varies much, but is generally brownish above and yellowish white below, variously mottled, and sometimes pied and marbled. It is common in the European seas, especially those washing the northern countries; it is fattest in spring, when it is hunted in many ways for the oil and skin; a single large animal will yield from 8 to 12 gallons of oil excellent for lamps; the leather is used for boots, and the hide for caps, trunk covers, &c.; the matter which lubricates the hair has a penetrating and offensive odor. Along the New Brunswick coast this species, which is called there the harbor seal, is often seen in summer; the fur is very handsome, and is highly prized by the Micmac Indians; it is also common all along the New England shores, but is not pursued as a business.—The great or bearded seal (*P. [C.] barbata*, Fabr.) grows to a length of 10 or 12 feet, and is found principally among icebergs in the open sea, and occasionally on the northern shores of Europe; the head is long, with a very prominent forehead like that of a sheep, large muzzle, tumid lips, and long, white, horny, flexible whiskers; the eyes large and the iris brown; fore paws more free than in the common seal, with the middle finger the longest; the body is robust, the back elevated, the tail about 7 inches, and the skin thick; the molars in a straight series, and often absent in very old animals; the color is a uniform dark brown, lighter in the young. They seem to associate in pairs, and not with other species, and the young are born late in autumn; they yield less oil in proportion to their size than the common species, but the lard and skin are much esteemed by the Greenlanders; the flesh, according to Pennant, is delicate and as white as veal. The Greenland or harp seal (*P. [C.] Groenlandica*, Müll.) is about 6 feet long; the males are grayish white, with the face and a broad lunate mark on the back and sides black; the females are brownish with blackish spots, and the young snow white; the molars are in a straight line, with a small interval between them and the anterior tubercle obsolete; the posterior margin of the palate almost directly transverse. They are found in herds on the coast of Greenland on floating ice, rarely venturing on shore or shore ice; they are sometimes floated to the coasts of Great Britain, and are not uncommon on those of Labrador and Newfoundland. This is the most important of all to the Esquimaux, who harpoon it from their kaiaks; they eat the flesh and fat, and use the oil in lamps; the fried liver is esteemed by arctic navigators; the oil is the best and most abundant in this species, and the skins form an important article



in the fur trade. The young are born in spring. The grampus and other northern whales are said to pursue and feed upon them. The hare seal or sea hare of the Russians (*P. [C.] leporina*, Lepechin) is between 6 and 7 feet long; the head is elongated, the upper lip tumid and calf-like, the front of it covered with strong whiskers; fore paws feeble, and membrane of the hind straight; the color is dull yellowish white, without spots; the hair is erect, and soft like that of the hare. It frequents the White sea, ascending the rivers with the tide, and the coasts of Iceland, Spitzbergen, and Kamchatka.—In the genus *halichærus* (Nilss.) the muzzle is very deep and obliquely truncated, the head flat, the upper molars simple, the lower with 2 obsolete tubercles. Here belongs the gray seal (*P. gryphus*, Fabr.; *H. griseus*, Nilss.), which has the 3 or 4 anterior molars with simple roots, and the palatal foramina on the palate bones; it grows to a length of 8 or 9 feet, and the general colors are gray and brown variously distributed, the young being lighter; it is abundant on the coasts of Iceland and in the Baltic, often coming to the Irish shores; it possesses but little intelligence, and cannot be tamed; the old males are very quarrelsome. A species of seal (*P. Caspica*, Pall.), about the size of the common seal, occurs in the Caspian sea and in Lakes Aral and Baikal; it affords an excellent oil, to obtain which many thousands are annually killed.—In the narrow-muzzled seals belongs the genus *stenorhynchus* (F. Cuv.), with the incisors  $\frac{1}{2}$ , pointed, and the molars  $\frac{2}{3}$ – $\frac{3}{4}$ , divided into 3 to 5 long points, conical, somewhat hooked, and usually 2-rooted; the snout is long and narrow, and the claws, especially on the hind feet, very small, hence called *leptonyx* by Wagner and Gray. The leopard seal or sea leopard (*S. Weddellii*, Less.; *L. leopardinus*, Wagn.) is 9 or 10 feet long, spotted above somewhat as a leopard, whitish on a grayish brown ground, and yellowish below; the head is long and small, the neck long and tapering, and the hair soft and thin; it frequents the frozen seas of the southern hemisphere, about the S. Shetland and Orkney islands.—In the genus *pelagiæ* (F. Cuv.) the snout is broad and long; the number of teeth is the same as in the last genus, but the incisors are indented and shut into each other, and the molars are thick, compressed toward the crown, with rudimentary points and central conical cusp. The white-bellied or monk seal (*P. monachus*, F. Cuv.) grows to a length of 8 or 10 feet; it is shining dark brown above, spotted with gray on the neck and head, and the lower parts white extending on to the sides; eyes large and ox-like; it is gentle, easily tamed, intelligent, and affectionate; it is found in the Adriatic sea and on the coast of Sardinia, and was the one best known to the ancients; its skin was believed by the old Romans to be a preservative against lightning, and tents were accordingly made of it under which they took refuge in thunder storms.—In the genus *stematops* (F.

Cuv.) or *cystophora* (Nilss.), the incisors are  $\frac{1}{2}$  and conical, the canines large, and the molars  $\frac{2}{3}$ – $\frac{3}{4}$  simple-rooted, compressed and striated, with 3 lobes and many small indentations; the generic name is derived from a soft crown-like appendage from the nose to the back of the head. The hooded or crested seal (*P. leonina*, Fabr.; *S. cristatus*, F. Cuv.) attains a length of 7 or 8 feet; the color is dark brown above with gray spots, the young being light-colored; they have on the head a membranous and muscular sac covered with hair, divided into chambers by a prolongation of the nasal septum; when the nostrils are closed this can be inflated with air; the skins are among the most common in the market. They are fond of the ice islands of high northern latitudes, coming down to the coast of Labrador; they are polygamous, fierce when wounded, and fight furiously with each other. The appendage on the head may be, as the fishermen suppose, a reservoir of air for use during submersion, or an accessory to the organ of smell, as its vascular nature would seem to indicate.—In *macrorhinus* (F. Cuv.) the incisors are far apart, hooked like small canines, the central ones the smallest; the canines are strong tusks; the molars have simple roots, the crowns appearing like nipples on a rounded base; the number of teeth is the same as in the preceding genus; the forehead is very prominent, the bones as in the elephant for supporting a trunk; the nasal bones are very short, and the maxillaries long with a very large nasal opening between them. The bottle-nosed seal or sea elephant (*M. proboscideus*, F. Cuv.) is the largest of the seal family, attaining a length of 25 feet or more, with a circumference of about 16, the size as well as the proboscis justifying the popular name. The males are generally of a dark grayish blue or brown color; they can elongate the muzzle to a foot in length, strangely changing the expression of the face and modifying the voice; the females are dark olive brown above and yellowish below, and do not have the nasal appendage; they are polygamous, and the males in the breeding season very pugnacious; they have 4 fingers and a short thumb on the fore limbs with perfect nails, and the hind toes nailless. The hair is rather coarse, but the thick skin is in much request for harnesses; they are an object of great commercial interest for their oil; a single animal will yield 14 to 15 bbls. of blubber, from which the oil is obtained as in the whale; the oil is clear without bad odor or taste, and burns slowly and without smoke; in England it is used for softening wool and in the manufacture of cloth; the salted tongues are esteemed as food. They are found in large herds on the shores of the islands of the antarctic seas, going north in winter to the coasts of Patagonia, remaining between lat. 35° and 55° S.; they prefer sandy and desert beaches, in the neighborhood of fresh water, in which they like to wallow. They are mild and docile, never attacking man unless brutally treated by him; such has

been the indiscriminate slaughter of old and young that they are now very scarce in their former accessible haunts, and must be sought amid the antarctic ice. This species is half as large as the Greenland whale, and very much larger than the largest elephant.—The last genus which will be mentioned is *otaria* (Péron), which includes the *platyrhynchus* and *arctocephalus* of F. Cuvier, the sea lions and sea bears respectively. The incisors are  $\frac{1}{2}$ , the 4 upper middle ones with broad crown divided by a transverse groove, the outer 2 conical; molars  $\frac{1}{2}$ — $\frac{3}{4}$ , sometimes with one less above; the fore feet are placed further back than in the other seals, and are therefore better swimming organs, giving an appearance of a longer neck; the hind feet have the membrane prolonged beyond the nails into long straps or ribbons; the fore feet are nailless, and the lower surface of all the limbs is without hair; there are also small external ears, from which these seals are called otaries. The name of sea lion has been given to a number of large seals of both hemispheres, either from their savage appearance, roaring voice, powerful canines, or maned neck. The northern or Steller's sea lion (*O. [platyrhynchus] Stelleri*, Less.) is about 15 feet long, with a weight of about 1,600 lbs.; the males have stiff curled hair on the neck, a thick hide, coarse hair of a tawny reddish color, and a mane of erect hair; the head is large, and the nose long and truncated, the eyebrows bushy, and the ears distinct. They are found on the E. shores of Kamtschatka, about the Koorile islands, and the N. W. coast of America, on rugged coasts and desert rocks in the ocean; savage as is their aspect, they flee at the approach of man, and do not resist unless reduced to extremity; they are polygamous; their food consists of fish, the smaller seals, sea otters, and marine birds and animals. The southern sea lion (*O. jubata*, Desm.) is of about the same size and general appearance as the last, with similar habits, is heavy and clumsy in its gait, and fears man; it is found in the south seas, sometimes coming to the Patagonian coasts; it is rarely hunted except by savages, though the oil is excellent. The name of sea bear has been applied to many smaller seals of both hemispheres, with a less ferocious aspect but fiercer disposition than the sea lions; they form the genus *arctocephalus* (F. Cuv.). The northern ursine seal or sea bear of Steller (*O. [A.] ursina*, Cuv.) is about the size of a large bear, between 7 and 8 feet in length; the forehead is much arched, the lips tumid, and the ears nearly 2 inches high; close to the skin is a soft wool of a reddish color, over which is a dark coarse hair; the females and young are ashy. It is found in great numbers in the N. Pacific, on the N. W. coast of America, and Kamtschatka; it is very fat in spring before the young are born; it is polygamous, the males tender to the young but tyrannical to the females; if wounded, it will attack a boat, and is very tenacious of life; this species is the terror of the smaller seals and sea otters, and

is itself afraid of the sea lion; the skin is much prized by the Chinese. The southern sea bear or the fur seal of commerce (*O. Forsteri*, Less.) is smaller than the last, but larger than the common seal, the males being about 7 feet long, and the females considerably smaller; the hair is of different colors, black, brownish, gray, and variously spotted with grayish and yellowish, and the under fur is short and fine. It was formerly very abundant about the islands of the southern ocean, especially the Falkland, but has been so hunted that it is now almost extirpated. It yields the soft yellowish fur once in great demand for caps and coat linings; the long hair is removed by heating the skin and then carding it with a large wooden knife, leaving the fine under fur uncovered; a skin is worth \$2 or \$3 in China, and considerably more in Great Britain and the United States.—A few fossil remains belonging to species of seals, nearly allied to the common and monk seals, have been found in the upper tertiary formations of Europe and North America.

SEAL (Lat. *sigillum*), a piece of metal, stone, or other hard substance on which is engraved some image or device, and sometimes a legend or inscription. It is used for making impressions on wax or the like material affixed to legal instruments so as to furnish evidence of their authenticity. The word seal sometimes means only the implement employed, but both in legal and in common language it is applied also to the thing impressed. The use of seals may be traced to the remotest antiquity. The Bible contains frequent allusions to them, and they abound among Assyrian and Babylonian remains. Kitto says that seals were anciently used in the East, not for impressing devices upon wax or similar substance, but for stamping the name of the owner. From the East the use of seals passed to Greece and thence to Rome; and it has been common in all the European states from the earliest historical periods. The study of diplomatics has brought to light a variety of interesting facts concerning the form, material, and inscriptions of seals attached to public documents, the authenticity or proximate date of which may often be determined by the seal. Among both the Greeks and the Romans the seal was usually set in a ring, whence *annulus* came to be a Latin name for a seal. The word *bulla* has always been used in Europe to designate specifically an impression in metal, and thus came to be the distinctive appellation of a class of instruments sealed in that way. Such, for example, are the edicts and briefs of the Roman pontiffs (see BULL, PAPAL), and some constitutions of the German emperors.—The shapes of seals are various. The circular form is common to all periods. The ogive, the spade form of the escutcheon in heraldry, appeared with the pointed style in architecture, and was in the course of time exclusively appropriated by abbeyes, chapters, bishops, and other ecclesiastical bodies and persons. The oval form was particularly frequent in France

during the reigns of the Merovingian and Carolingian kings. The size varied at different periods, and in general the smaller and thicker the seal, the older it is. Those of the Merovingian kings are hardly more than an inch in diameter, while that of Francis I. of France had a breadth of 4 inches. The Egyptian priests used in sealing a sort of clay; and so it would seem did other ancient nations of the East. The Roman *creta* and *maltha* were probably not chalk or clay alone; possibly wax was mixed with these substances. The Byzantine emperors sealed in the form of *bullæ* with lead, and sometimes with silver and gold. Silver *bullæ* are much rarer than those of gold. The wax most anciently employed was white. When, about the 9th or 10th century, wax was made of various colors, only emperors and kings might seal in red. In the 12th century it was customary in France to seal with green wax letters addressed to persons of high eminence. This color was introduced into Germany in the 14th century, and was appropriated by religious houses and cities. Blue seals are very rare, and Charles V. of Germany is said to be the only European monarch who used this color. The patriarchs of Jerusalem and Constantinople, and the grand masters of the order of Malta and of the Teutonic order in Germany, sealed in black. Private persons usually used yellow wax, and this color is frequent in public documents of about the 12th century.—The devices upon seals throw not a little light upon the manners and usages of different ages, and some of them have positive historical value. The seals of the Romans were engraved with the portraits of their ancestors or friends, with mythological subjects, or with symbolical allusions to the real or mythical history of their families. Perhaps the earliest authentic instance of a seal bearing armorial devices is that of Arnulphus, count of Flanders (941). Such seals were not common until the 13th century. The early seals of religious communities and of cities were inscribed with the image of their patron saint or of some sacred relic, or with the figures of ecclesiastical dignitaries or magistrates. The name of the owner in seals attached to public documents usually forms part of the inscription. The ancient intaglios were frequently used for seals in the times of the early French kings. They were used chiefly for counter-seals, and by the addition of a pious text or legend it was attempted to give a sacred character to their profane subjects. On the counter-seal of the church of Noyon the salutation, *Ave Maria, gratia plena*, is engraved about a figure of Minerva, who wears a helmet graced with the head of Socrates.—The most ancient mode of sealing was probably that of applying the wax directly to the parchment. When the instrument was written upon two or more leaves, the wax was made to reach them all by impressing it upon an incision made in the parchment in the form of a cross. The seal was sometimes also made upon the ends of

thongs or strips of parchment run through the several sheets. Lead, silver, or gold *bullæ* were almost of necessity appended by a cord or strip. In the 12th century it seems that in France at least pendent seals had displaced the other sort. They are still used generally for letters patent, treaties, and other important public documents. During the 12th century too, though the practice was not well established until the 13th, arose the contrivance of counter-seals, that is to say, the use of a different impression upon the reverse of the proper seal. They are said to have been first applied to the pendent seals. They were in these cases made of the same size with the chief seals, and the mottoes interrupted on these were continued on the counter-seals.—With regard to the mode of using seals, we find that, although in some periods they have taken the place of signatures, yet very often seal and signature have been employed together. In Rome, the prætorian law had recognized the validity of testaments that were only sealed by the witnesses; yet an imperial constitution afterward required the adscription of their names also. In the constitutions of the Merovingian and Carolingian kings, the seal ordinarily supports the monogram or signature of the sovereign, but sometimes it stands alone. From the 8th to the 10th century the use of seals in France was confined almost entirely to the kings. Most instruments of this period are attested, so far as the witnesses at least are concerned, only by the mention of their names. They neither sign nor seal, nor even make with their own hands the crosses prefixed to their names. About the 12th or 13th century the use of seals among all classes became general, and continued so until the revival of learning made autographs possible and seals of less use. In England charters and grants of the Anglo-Saxon and Anglo-Danish reigns were authenticated by the signature of the grantor preceded by the figure of a cross. The execution was attested by the subscription of the names of the witnesses, each name being preceded by a cross. Seals were certainly not often used in England until late in the 11th century, and then by no means commonly. William the Conqueror was not, as is often said, the king who first introduced seals into England. There are extant unquestioned seals of Edward the Confessor, and he certainly first adopted a pious seal for England; and on solemn occasions even the predecessors of Edward had used at least private seals. The general use of seals in England for authenticating charters and other instruments was not fairly established till near the middle of the 13th century. In Scotland, a statute of the time of Robert III. (1390–1406) declared that every baron or tenant *in capite* of the king must have a peculiar seal for his sovereign's service; and a statute apparently in aid of this one, passed in the next reign (James I.), enacts that every freeholder shall appear at the lord's court with his seals, or if he cannot

appear in person, he shall send them by his attorney; and it seems to have been customary for gentlemen at this time to deposit copies of their seals in the office of the court of their county, the seal then and until 1540 sufficing without signature to authenticate an instrument. In the year just mentioned a statute of James V. declared that, inasmuch as seals might be lost or counterfeited, all documents must henceforth be not only sealed but subscribed.—From the universal use of seals in England it came to be English law that no charter, grant, or other instrument of conveyance, was *factum*, that is, done, or in other phrase a deed, until it was sealed; and such was the virtue of a seal, that down to the time of Charles II. it alone sufficed to make a writing valid and binding. The statute 29 Charles II., the so called statute of frauds, enacted that certain writings should for the future be signed; but it is probably the better opinion that, even since the statute, a deed duly sealed is good without the subscription of a name.—The old common law definition of a seal is that given by Lord Coke: *Sigillum est cera impressa*—"A seal is an impression in wax;" but it has long been held that a wafer or other tenacious substance, on which an impression is or may be made, is a good seal. In many, perhaps indeed most of the United States, neither wax, wafer, nor any other substance is required. In most of the southern and western states, a scroll or ring made with the pen in imitation of, or as marking the place of, the seal is sufficient. In New Jersey this applies only to obligations for the payment of money. In Virginia, Georgia, Missouri, and Arkansas, the scroll must be expressly recognized as the seal in the body of the instrument. One piece of wax suffices for several signers if stamped with their separate impressions; or several signers may adopt one seal; and an adoption of this sort is inferred when the deed recites the sealing "with our seals," and those who did not in fact seal do yet sign and deliver the deed.—The significance of the seal in law at present is, that it imports a deliberate and considered act on the part of him who affixes it. That the law should hold that a grantor's writing his name by the side of a bit of colored paper, stuck to the deed by the draughtsman, or flourishing a scroll after his name, imports, because of the seal or flourish, and not at all because of the signature, the deliberation or consideration of the grantor, may seem absurd. But with or without reason the rule has established itself firmly in the law, that an instrument thus executed with a seal implies a consideration, or in other words that full assent which is essential to the validity of every contract, and which can be inferred only from a seal, or from something of value passing between the parties as the cause of the contract.

SEAL ENGRAVING. See GEM, vol. viii. p. 127.

SEAL FISHERY. See SEAL.

SEALING WAX, a composition of shell lac and other substances used to receive the impression of seals. Beckmann notices the use of sealing wax upon a letter received in Germany from London in 1554, and upon others a few years later. The Portuguese had it in common use at this period, and are supposed to have introduced it from India. In Venice and Spain it was also well known at this time, and in other parts of Europe it was introduced under the name of Spanish wax. As it contains no wax, this name must have been transferred to it from the material previously in use for the same purpose. Numerous receipts are given for its preparation, some of which, as for red and black sealing wax, are cited in LAC, vol. x. p. 280. Sealing wax is made of much better quality from lac of the first fusion than from that purchased in the shops. That prepared in India should therefore be the best. For bright-colored sealing wax the palest shell lac is to be selected. When the shell lac is melted, the proper proportion of Venice turpentine added, and the coloring matter has been briskly stirred in, the mass may be rolled upon a warm marble slab with a smooth wooden block to form the round sticks. Oval sticks are cast in moulds. The addition of 1 per cent. of balsam of Peru is customary to communicate an agreeable odor to the wax when it is used. Beside the mixtures already referred to, the following are recommended: 1. For red: 6 parts shell lac, 4 Venice turpentine,  $\frac{1}{2}$  rosin,  $1\frac{1}{2}$  cinnabar; or 4 parts bleached lac, 1 Venice turpentine, 8 Chinese vermilion. 2. For yellow: 4 parts lac, 2 Venice turpentine,  $\frac{1}{2}$  rosin,  $\frac{1}{2}$  king's yellow. 3. For green: the same, except king's yellow  $\frac{1}{2}$  and mineral blue  $\frac{1}{2}$ . 4. For gold: 8 oz. lac, 4 oz. Venice turpentine,  $\frac{1}{2}$  oz. bronze,  $\frac{1}{2}$  oz. magnesia with oil of turpentine, and 14 sheets of gold leaf. Sticks of inferior wax of cheap materials are sometimes made to appear like the best by rolling them when soft in the best powdered wax and then melting this in. The finest red wax melts at 140°, and the best impressions are obtained by softening it by the flame of a candle, but not igniting it. Seal engravers obtain their fine proof impressions in the following manner: The seal is prepared by warming it to as high a temperature as the hand can bear, brushing over the face of it a thin layer of clean tallow, and with a camel's hair brush coating this with vermilion. Some wax is detached from the stick, softened near a candle, and being placed upon a piece of stout paper is gently warmed till it is soft enough to be stirred and worked up into a conical heap. The seal, at about the temperature of the wax, is then quickly stamped upon it with a firm straight blow and moderate pressure.

SEALSFIELD, CHARLES, a German author. He received a university education, emigrated to the United States, of which he became a citizen, and revisited his native land in 1826, where he published a book in German on his adopted country. Thence he went to England,

returned to America in 1827, and published in Philadelphia his first romance, "Tokeah, or the White Rose" (1828). During 1829-'30 he was one of the editors of the New York *Courrier des États Unis*, went to Paris in 1830 as correspondent of the New York "Courier and Enquirer," and in 1832 went to Switzerland. There he published a translation and revision of "Tokeah," entitled *Der Legitime und der Republikaner* (8 vols., Zürich, 1833), the favorable reception of which prompted him to write a series of works on American life. These appeared in succession under the title of *Transatlantische Reiseskizzen* (2 vols., 1833); *Der Virey und die Aristokraten*, (2 vols., 1834); *Lebensbilder aus beiden Hemisphären* (6 vols., 1835-'7); *Sturm-, Land- und Seebilder* (1838-'9); *Kajütenbuch, oder nationale Charakteristiken* (2 vols., 1840); and *Süden und Norden* (8 vols., Stuttgart, 1842-'3). They were introduced to English readers by translations in "Blackwood's Magazine," when great curiosity was excited as to their source. Since then most of these works have been translated and republished in New York. Sealsfield resides alternately in Switzerland and the United States.

**SEAMAN**, a sailor. The legislature and the courts, particularly the courts of admiralty, regard seamen as peculiarly in need of and entitled to special protection. The statute provisions in their behalf in the United States are carried further in some respects than those of any other nation. Seamen may be hired in four ways. 1. They may be employed for a certain voyage and receive a certain proportion of the freight earned. This contract is probably rarely made in this country, except for small coasting vessels. 2. They may be hired for a certain voyage or by the run, and paid a round sum at the close, and this is not very unusual. 3. They may be hired on shares, which is a practice nearly if not quite confined to whaling and fishing vessels. 4. But much the most common usage is to hire them for a definite voyage or voyages, or for a definite period on monthly wages.—Under penalty of a considerable forfeiture, the United States laws require that every master of a vessel bound from a port in the United States to any foreign port, or of any ship or vessel of the burden of 50 tons or upward, bound from one state to any other than an adjoining state, shall have shipping articles, which must be signed by every seaman on board. They must describe accurately the voyage and the terms upon which the seaman ships. Wherever there is doubt as to the meaning of the obligation, the sailor, rather than the ship owner, has the benefit of the doubt. The shipping articles ought therefore to declare explicitly the ports of the beginning and end of the voyage, and in all other respects ought to be clear and fair. To all clauses or stipulations which tend to lessen the usual rights of the seaman, it must appear that he gave intelligent and deliberate assent. All interlineations, alterations, or era-

tures are presumed to be fraudulent unless satisfactorily explained. Accidental omissions in the articles may be supplied by parol; and a seaman may also by parol show that the voyage or time represented to him was not that which appears in the papers, or that the articles have been altered since they were subscribed. In the United States the shipping articles for a fishing voyage are required to be indorsed or countersigned by the owners; but in an action for wages the seaman is not restricted to those who sign, but may show *aliunde* who were the actual owners.—The owner is bound to provide a seaworthy ship, and our statutes furnish the means of lawfully ascertaining her condition on the complaint of one of the mates and a majority of the crew, by a regular survey at home or abroad. If seamen, after shipping, refuse to proceed on the voyage and are arrested for the mutiny, the condition of the vessel, if that be the excuse, is inquired into by the court; and if she be found unseaworthy, their punishment is reduced and mitigated accordingly. So, unseaworthiness is a sufficient defence to the charge of endeavoring to commit a revolt by compelling the master to return to port.—Provisions of due quality and quantity are to be furnished by the owner, under the general principles of law as applied from the earliest times to this particular contract. The quantity for each man on board is however here prescribed by statute, under penalty of a day's wages to every seaman for the days on which he is on short allowance. But these wages are not to be paid if the necessity of short allowance arose from a peril of the sea, or any accident of the voyage, or the delivery of a part of the provisions to another vessel in distress. Nor, as it is clear that the master must have a discretion in the expenditure of the provisions, is putting the crew on an allowance necessarily the same thing as putting them on short allowance. A deficiency in one kind of provisions is not compensated by an abundance of another.—By the general law merchant there is an obligation upon every ship owner or master to provide for a seaman who becomes sick, wounded, or maimed in the discharge of his duty, whether at home or abroad, at sea or on land, if it be not by his own fault, suitable care, medicine, and medical treatment, including nursing, diet, and lodging. Sickness is provided for by express statutes, which go so far as to require that every ship of the burden of 150 tons or more, navigated by 10 or more persons in the whole, and bound on a voyage without the limits of the United States, should have a proper medicine chest on board. Whenever other appliances are required, or whenever surgical skill, or attendance, or nursing, other and better than that which the ship can afford, becomes necessary, the expense will be charged on the owners under the general maritime law. By other statutes the master may deduct 20 cents a month from every seaman's wages to make up

a fund for the support of marine hospitals, in which every sailor may have medical treatment.—Disobedience or misconduct of a sailor is of necessity punishable with great severity, because without good discipline the ship would always be in great peril, and no voyage could be successfully conducted. Formerly there was no specific limit to the right of punishment. It might be administered by the master in any form and in any measure, he always being responsible for any excess or cruelty, both criminally and in damages to the seaman. Now, however, by the statute of 1850, flogging is abolished and prohibited by law. This has been declared by very high authority to include the use of the cat and every similar form of punishment, but not necessarily to include all corporal punishment, such as a blow with the hand, or a stick or rope. The statute contemplates deliberate flogging, and not that sudden violence, like blows, which may be inflicted in an emergency, to compel immediate obedience. Generally the only punishments which can now be resorted to, to secure good conduct, are forfeiture of wages, irons, imprisonment, hard labor, and such other means as may be invented in the place of flogging. The penalty of forfeiture of wages may not be imposed for one trivial act of irregularity, nor for a single or occasional act of intemperance; the offence must be habitual to warrant the infliction of the penalty. The master or a seaman may forfeit all his wages for smuggling; or the damage actually sustained by the owners of the vessel from this offence may be charged upon the wages of the offender, but only those wages earned before the act of misconduct are forfeitable.—Desertion is distinguished from absence without leave by the intention not to return. Thus, it is not desertion for the seaman to leave the ship, against orders, for the purpose of entering complaints for ill treatment before the consul; nor is it desertion when the vessel is left for a good cause, as a change of the voyage without consent, cruelty, insufficient provisions, or unseaworthiness of the ship. The seaman must be received, if he offer to return in a proper way and in a reasonable time, before any other person is engaged to take the place. If he returns after desertion and is received by the master, or by the owner, this is a condonation of his offence and a waiver of the forfeiture, and it has this effect even if there be a clause to the contrary in the shipping articles. If the sailor deserts before the voyage begins, by not rendering himself on board, he forfeits his advance wages and an equal sum in addition, or he may be apprehended under the warrant of a justice and be compelled to go on board. If he deserts on the voyage, he forfeits all his wages and all his property on board the ship. By act of 1856, chap. 127, in case of desertion in a foreign country, the port and the date thereof must be noted by the master on the list of the crew, and be officially authenticated before a consul or notary public at the first port visited after

such desertion. The wages of the seaman and his interest in the cargo, if any, are forfeited to the United States, subject to the deduction by the ship owners of any expenses they may have necessarily incurred in consequence of such desertion.—The right of the sailor to be brought back to his home is very jealously guarded by our laws. Every ship must be provided with the shipping articles and a shipping list verified under the oath of the master; this he is required to present to the consul or commercial agent of the United States at every port which he visits, when so requested, and is under bond to deliver to the boarding officer who comes on board his ship at the first home port which he reaches, and to produce the persons named therein, that it may be ascertained that he has his whole crew on board. If it appears that any of them are missing, he must account for their absence. If he discharges any of them abroad, with his or their own consent, he must pay to the American consul of the port or the commercial agent, over and above the wages then due, 3 months' wages, of which two thirds are paid to the seaman, and one third retained by the consul and remitted to the treasury of the United States, to form a fund for the maintenance of American seamen abroad and for bringing them home. If repairs to the ship become necessary, or if the ship be captured, the seamen may hold on for a reasonable time awaiting the prosecution of the voyage; and if discharged before this time has elapsed, they may claim their extra wages. The discharge of a seaman for good cause, like disobedience, misconduct, or disability by his own fault of extreme degree, may be authorized by our consuls or commercial agents in foreign ports. If the ship be unseaworthy, the shipping articles be violated by the master, or the sailor be subjected to cruel treatment, he may be discharged by a consul and recover his 3 months' pay. If the master discharges the seaman, against his consent and without good cause, in a foreign port, he is liable to a fine of \$500 or 6 months' imprisonment, and the seaman may recover full indemnity for all loss or expense incurred by such discharge.—It is an ancient maxim of the maritime law that freight is the mother of wages, so that where no freight is earned no wages are earned. But, more properly speaking, wages are earned whenever freight is or might be earned, for the sailor ought not to and does not lose his dues when the ship fails to earn freight on account of the fraud or wrongful act of the master or owner. Nor will any special contract between the owner and the freighter, varying the obligation to pay freight from that implied by the general law, have any effect upon wages. If the voyage is broken up, or the seamen are dismissed without cause before the voyage begins, they have their wages for the time they serve, and a reasonable compensation for special damages. In cases where the voyage is broken up by misfortune, so that the master would be

justified in discharging the crew, they are still entitled to their wages. So a seaman has full wages if he is compelled to desert by the cruelty of the master, or if he is disabled by sickness, even if, by reason of that sickness, he was obliged to be left at a foreign port. Seamen have a lien for their wages on the ship and freight. Statutes give the same lien to fishermen on shore. It attaches not only to ship and freight *in re*, but to the proceeds of both or either, and follows them into whose hands soever they may go. It prevails over bonds of bottomry and other like hypothecations, because the services of the sailor save the ship for all claimants. Pilots, engineers, firemen, and deck hands are seamen, and have this lien, and so have all persons whose service is materially and directly useful to the navigation of the vessel.—A seaman cannot insure his wages, nor derive any benefit from the insurance effected by owners on ship or freight. It is the policy of the law, for obvious reasons, to make the sailor find all his interest in the security and welfare of the ship.

**SEARCHII, RIGHT OF**, the right of a belligerent to visit, by his lawfully commissioned cruisers, all private ships sailing on the high seas, and to examine their papers, and their cargoes if need be, in order to ascertain their destination and character. It is a familiar doctrine of international law that the ships of a state form a part of its domain, and that over them, as over its landed territory, the sovereignty of the state extends supreme and inviolable. In a time of general peace, these ships cannot be detained or boarded by the public ships of another power for the purpose of inquiry into their character or business, because such an act is an intrusion upon and in derogation of the sovereignty of the state whose ships are so visited. In time of war, however, the general consent of nations yields to the belligerents the privilege of visiting and searching ships professing to be neutral, in order that they may know that the neutral flag does not mask an enemy or cover contraband of war. This privilege of search being then plainly indispensable, the consent of nations has allowed it to become a rule, or we may say a right; and so firmly is this rule or right established that there is no doubt or dispute about it among institutional writers, and it has never been successfully resisted in the practice of nations. During the American war, and afterward in 1801, the Baltic powers declared that the flag of a state was a substitute for all documentary proof, and excluded the right of search. They armed themselves for the purpose of defending and maintaining this position, but they were soon compelled to abandon it, and since that time the usual war right has been considered incontrovertible.—The question was once submitted in the English admiralty whether neutrals might not compel a belligerent to refrain from exercising his right by putting their ships under the convoy of a public ship of their country. It was adjudged

that the belligerent was not bound to accept such a substitution, nor indeed in any respect to vary his right of personal visitation. It may be remarked in passing that two powers sometimes regulate or restrain by treaty the right of maritime search by ships of war.—The English doctrines upon the war right of search have been admitted almost without exception in this country. Upon one point, however, our government has differed from England, namely, respecting the claim put forth by the latter power of a right to search neutral vessels on the high seas for deserters and other persons liable to military and naval service. The difference upon this point was one of the chief causes of the war of 1812, and the matter has never yet been specifically settled, but it cannot be supposed that the British claim will ever be reasserted.—The modifications of belligerent rights which have been introduced into international law and practice within the last 10 years have not materially limited or otherwise affected the right of search. Though the great powers of Europe, assembled at the congress of Paris in 1856, granted large immunities to neutrals, declaring that henceforth free ships should make free goods, yet the exception of contraband, which accompanies the rule, leaves the old right of search undisturbed.

**SEARCY**, a N. co. of Arkansas, intersected by the Buffalo fork of White river; area, 900 sq. m.; pop. in 1850, 1,979; in 1860, 5,271, of whom 93 were slaves. The surface is hilly and the soil productive. Extensive forests cover a large portion of the country. In 1850 the productions were 123,618 bushels of Indian corn, 14,302 of oats, and 4,878 of wheat. Capital, Lebanon.

**SEARS, BARNAS, D.D.**, an American clergyman and scholar, born in Sandisfield, Mass., Nov. 19, 1802. He was graduated at Brown university in 1825, and in 1829, having completed a course of theological study at Newton, Mass., and been pastor of the first Baptist church in Hartford, Conn., for two years, he was appointed to a professorship in the Hamilton literary and theological institution, now Madison university, New York. In 1833 he went to Europe, and studied for several years at Halle, Leipsic, and Berlin. Upon his return he was appointed to a professorship in the theological seminary at Newton, where he remained 12 years; during the latter part of this period he was president of the institution. In 1848, on the resignation of the late Horace Mann, he was made secretary and executive agent of the Massachusetts board of education. In Aug. 1855, he was elected by a unanimous vote of the trustees and fellows of Brown university to be president of that institution, which office he still holds. Dr. Sears has published a new edition of Nöhdén's "Grammar of the German Language" (Boston, 1842), with alterations and large additions; "Classical Studies" (1849), consisting of essays on ancient literature and art, with the biography and correspondence of eminent philologists,



prepared in conjunction with the late Prof. B. B. Edwards of Andover, and C. C. Felton, now president of Harvard university; "Oiceroniana, or the Prussian Mode of Instruction in Latin" (1844), consisting of short extracts from the writings of Cicero, with notes, and an introductory account of the Prussian system of education; "Select Treatises of Martin Luther in the Original German" (1846), with philological notes, and an essay on German and English etymology; "Life of Luther, with spécial reference to its earlier Periods and the Opening Scenes of the Reformation" (1850), since republished in England under the title of "The Mental and Spiritual History of Luther;" a revised and enlarged edition of Roget's "Thesaurus of English Words and Phrases" (1850); numerous reports on education, occasional addresses, and contributions to the "Christian Review," "Bibliotheca Sacra," and other periodicals. Of the first named quarterly he was for several years from 1838 the editor.

SEASONS (Fr. *saisons*), the four quarters of the year, spring, summer, autumn, and winter. These periods are determined astronomically by the movements of the sun in the ecliptic. Its passage across the equator, bringing on days of greater length than the nights, marks the vernal or spring equinox, and occurs about March 21 for the northern hemisphere and Sept. 23 for the southern. These dates also mark the autumnal equinox or commencement of the autumn, the hemispheres being reversed. The summer solstice, when the day is of greatest length and the astronomical summer begins in the northern hemisphere, is about June 21, and the winter solstice about Dec. 21. The popular divisions of the year do not correspond with those of the astronomer, and are not the same in different countries. In England the spring commences with February, summer with May, autumn with August, and winter with November; but in the United States the seasons begin respectively with the months succeeding those named. The marked changes in the amount of heat and light imparted by the sun in the different seasons upon those portions of the earth outside the tropics, and which to the residents in these latitudes appear essential characteristics of the seasons, are not experienced in the equatorial regions. The sun as it passes twice each year over these regions sends down its rays so directly upon them, that the variations of temperature are comparatively inconsiderable; but the regularly returning winds and rains and dry periods consequent on the movement of the sun in the ecliptic are the most marked periodic phenomena, and by these the year is divided into two dry and two wet seasons, rather than into the four seasons of the temperate latitudes.

SEATON, WILLIAM WINSTON, an American journalist, born in King William co., Va., Jan. 11, 1785. On the paternal side he is descended from the famous Scotch family of the Seatons, one of whom, Henry Seaton, a staunch adherent

of the Stuarts, became a political exile to Virginia at the end of the 17th century. His mother, whose maiden name was Winston, was a cousin of Patrick Henry. He was educated by Ogilvie, the eccentric earl of Finlater, a Scotchman, who for several years kept a celebrated academy in Richmond. At the age of 18 he engaged ardently in politics, and for a while was assistant editor of a Richmond newspaper. He next took charge of the Petersburg "Republican," but soon purchased "The North Carolina Journal" at Halifax, the former capital of North Carolina, whence he again removed to Raleigh, the new state capital, and became connected with the "Register," an influential journal edited by Joseph Gales, senior, whose daughter he subsequently married. In 1812 he removed to Washington, and became partner with his brother-in-law Joseph Gales, jr., in founding the "National Intelligencer," which they conducted conjointly till the death of Mr. Gales in July, 1860, since which Mr. Seaton has been sole editor. From 1812 to 1820 Gales and Seaton were the exclusive reporters as well as editors of their journal, one of them devoting himself to the senate and the other to the house of representatives, where they had seats assigned them directly by the side of the presiding officers. Their "Register of Debates" is one of the standard sources of American history, and the "Intelligencer," in ability, candor, fairness, and courtesy, has ever been conspicuous among American newspapers. For 12 consecutive years, beginning with 1840, Mr. Seaton was elected mayor of Washington city. (See GALE, JOSEPH.)

SEBASTE. See SAMARIA.

SEBASTIAN, a W. co. of Arkansas, bounded W. by the Indian territory and N. by the Arkansas river; area, 825 sq. m.; pop. in 1860, 9,238, of whom 680 were slaves. The Poteau hills, a southern offshoot of the Ozark mountains, traverse a part of the county, and are rich in minerals. The soil is well adapted to grazing and the production of grain and cotton. Bituminous coal is found in abundance. The county has been formed from Crawford co. since 1850. Capital, Jenny Lind.

SEBASTIAN, Dom, king of Portugal, born in 1554, killed in battle in Africa in 1578. He succeeded his grandfather John III. in 1557, and assumed the government at the age of 14. While a boy he manifested a great fondness for the sciences and for feats of chivalry, and his thoughts were early turned to the conquest of Africa. In his 21st year he undertook with 800 or 900 soldiers an expedition against Tangiers, the result of which encouraged him to still greater effort. The war raging in Morocco between Muley-Malik and his nephew Muley-Hamet, the latter of whom had been deprived of the throne by the former, seemed to offer a favorable opportunity for the Portuguese monarch to interfere. With a fleet numbering about 1,000 sail, and having on board 15,000 soldiers, he sailed to Africa to support the cause

of the nephew in 1578. The landing took place at Azila, where he was joined by Muley-Hamet with his forces, and together they began the campaign by the siege of Alcazar. Muley-Malik, who had collected an army of about 100,000 men, gave battle, Aug. 4. After a desperate engagement, in which Sebastian displayed great heroism but no generalship, his army was routed and all but about 50 killed or taken prisoners; and he himself disappeared, but his dead body is said to have been recognized on the field by a page. Muley-Hamet was drowned in the flight, and Muley-Malik, who had risen from his sick bed to participate in the action, died, so that the battle was marked by the loss of all the chiefs. The flower of the Portuguese nobility was destroyed in this expedition, and Portugal, becoming a prey to anarchy, soon fell into the power of Spain. But the Portuguese could not believe that their king had been killed, and many adventurers sprung up who gave themselves out as the true Sebastian. Among these impostors the most remarkable was one who appeared in Venice 20 years after the battle, and asserted that he was left upon the field among the dead and wounded; that he had remained in Barbary, finally took the resolution of disclosing himself to the pope, on the way was plundered by robbers, and was recognized by a few Portuguese and taken to Venice. The senate of that city banished him, and on his return imprisoned him; but his case excited universal sympathy in Europe, and he was finally set at liberty, though exiled from Venice. He was imprisoned again at Florence, then taken to Naples, and, insisting upon his statements, was treated as a galley slave. He finally died in Castile.

SEBASTIAN, SAINT, a Roman martyr, born at Narbonne about 255, died in Rome, Jan. 20, 288. According to the anonymous "Acts" by which his history is preserved (supposed to have been written in the 4th century, and by some attributed to St. Ambrose), he was a captain in the prætorian guard under Diocletian, and used the facilities afforded by his station to propagate the Christian faith and to succor its persecuted professors. Having refused to abjure his religion, he was tied to a tree, shot with arrows, and left for dead. A Christian woman, seeking his body by night, found him still alive, and cared for him till he was restored; but, having ventured to appear before Diocletian to remonstrate against his cruelty, he was beaten to death with clubs and his body thrown into a sewer, but afterward recovered and interred. In the 9th century his relics were distributed throughout Christendom as a remedy against the plague. His martyrdom was the subject of many poems and paintings in the middle ages; in the latter he is generally represented tied to a tree and pierced with arrows.

SÉBASTIANI, HORACE FRANÇOIS, count, a French soldier, born at La Porta, Corsica, Nov. 11, 1775, died in Paris, July 21, 1851. He was the son of a tailor, and was educated for the

church by his uncle, a priest, but at the age of 17 enlisted in the French army. After being private secretary to Gen. Casabianca, he joined the army in Italy under Bonaparte, and was promoted to a colonelcy by Moreau on the battle field of Verona (1799). He zealously supported Bonaparte in the *coup d'état* of the 18th Brumaire, followed him to Italy, and shared in the victory at Marengo (1800). After the peace of Amiens he was sent on a mission to the East. On his return he received the rank of brigadier-general, actively participated in the campaign of 1805 against Austria, fought bravely at Ulm, was the first who entered Vienna at the head of Murat's vanguard, received a severe wound at Austerlitz, and was promoted to the rank of general of division. In May, 1806, he went again to Constantinople with the title of ambassador, and induced Selim III. to enter into an alliance with France and to declare war against Russia; and when the English attempted to interfere, he forced their fleet, which had appeared before Constantinople, to retire through the Dardanelles. Being placed at the head of the 4th corps of the invading army in Spain (1809), he distinguished himself on the banks of the Guadiana, at Ciudad Real, Santa Cruz, and Almonacid, took Ocaña, Granada, and Malaga, and conquered again at Baza (1810); but, dissatisfied with King Joseph Bonaparte, he insisted upon being recalled to France (1811). In the Russian campaign of 1812 he had a command in the vanguard of the army, participated in the battles of Smolensk and Borodino, and was among the first who entered Moscow. In 1813 he was wounded at Leipsic, but a few days later shared in the victory over Gen. Wrede at Hanau. During the campaign of 1814 he commanded 8 cavalry regiments of the imperial guard, and fought with marked intrepidity at Rheims, at Arcis-sur-Aube, where he successfully opposed the whole cavalry of the enemy, and at St. Dizier. He remained in retirement during the first restoration, and during the Hundred Days. After the battle of Waterloo he was one of the committee sent by the house to negotiate with the allied sovereigns. In 1819 he was elected deputy by the constituency of his native island, and figured among the most energetic members of the opposition. In 1826 he became again representative for the department of Aisne, and kept his seat until 1848. He at first did not fully approve of the revolution of 1830, but became reconciled to it through his friendship for the duke of Orleans, who after his accession to the throne as Louis Philippe made him minister of the navy and afterward of foreign affairs, which post he held with but a short interruption till 1834. The chamber of deputies having voted against allowing an indemnity of 25,000,000 francs due the United States, he retired from office, and was appointed ambassador to Naples. In 1835 he went to London in the same capacity, and was in 1840 promoted to the rank of marshal of France. His later years were embittered by

the dreadful death of his daughter, the duchess of Praslin, who was murdered by her husband in 1847. (See PRASLIN.)

SEBASTOPOL, or SEVASTOPOL, a fortified city of Russia in the Crimea, on a peninsula on the S. side of the roadstead of the same name, an arm of the Black sea; pop. 7,000. It has a fine harbor  $3\frac{1}{2}$  m. long and from 700 yards to 1 m. wide. The population previous to the Crimean war was over 40,000. In 1854-'5 the place was invested by the allied English, French, Sardinians, and Turkish armies, and after a protracted siege was taken, Sept. 8, 1855. (See CRIMEA.) Some portions of the destroyed southern part have since been rebuilt. One of the churches was erected by Vladimir, the first Christian czar, out of the remains of the ancient cities of Chersonesus. In 1780, when Russia commenced fortifying Sebastopol, it was a small Tartar village named Akhtiar.

SECANT (Lat. *seco*, to cut), in geometry, a straight line drawn from the centre of a circle past one extremity of an arc to the tangent to the other extremity.

SECKENDORF, VEIT LUDWIG VON, a German statesman and author, born at Herzogenaurach, near Erlangen, Dec. 20, 1626, died in Halle in 1692. He was educated at Strasbourg, visited the Netherlands, became librarian to the duke of Gotha, and gradually rose to the highest positions in the duke's government; but for some reasons now unknown, he entered in 1664 the service of Duke Maurice of Zeitz, after whose death he retired to his estate at Altenburg. The elector Frederic III. of Brandenburg (afterward King Frederic I. of Prussia) called him as privy councillor to Berlin, and made him chancellor of the university of Halle. His most important writings are: *Deutsche Fürstenthat* (Gotha, 1665); *Compendium Historiæ Ecclesiasticæ* (Leipsic, 1666), finished by Artopous; *Christenstaat* (Leipsic, 1685); *Jus Publicum Romanorum* (Frankfort, 1686); *Commentarius Historicus et Apologeticus de Lutheranism* (Frankfort, 1692).—FRIEDRICH HEINRICH, count, a German general and diplomatist, nephew of the preceding, born in Königsberg, Franconia, July 5, 1673, died at Meuselwitz, near Altenburg, Nov. 23, 1763. He was educated at Jena, Leipsic, and Leyden, and in 1695 entered the English and Dutch service, but afterward joined the imperial army and fought under Prince Eugene against the Turks and in the war of the Spanish succession. He subsequently became a major-general in the army of Augustus II. of Poland and Saxony, and in 1718 was the Polish ambassador to the Hague in the conferences which led to the peace of Utrecht. After the fall of Stralsund in 1715 he reentered the imperial service, in 1719 became count of the empire, and in 1721 general of the ordnance and governor of Leipsic. Five years later he was sent to Berlin as the imperial ambassador, and in Oct. 1726, concluded the treaty of Wosterhausen. He was employed by the Austrian government in negotiations

with various courts to secure their ratification of the pragmatic sanction. In the war of the Polish succession he defeated the French at Klausen (Oct. 20, 1735). On the death of Prince Eugene he received the command of the army acting against the Turks. The campaign of 1737 was unfortunate, as Seckendorf's intentions were all thwarted by orders from the imperial court; and as much jealousy existed against him on the ground of his being a foreigner and a Protestant, he was recalled and imprisoned for 3 years in the castle of Grätz. After his release he entered the service of Charles VII. of Bavaria, obtained the command of the Bavarian army, and acted with various success against the Austrians. Subsequently regaining his former position in Austria, he fell in 1758 into the hands of Frederic the Great, and was imprisoned by him 6 months in Magdeburg.

SECKER, THOMAS, an English prelate, born at Sibthorpe, Nottinghamshire, in 1693, died in London, Aug. 3, 1768. He belonged to a family of nonconformists, and studied with a view to the dissenting ministry, having Joseph Butler, author of the "Analogy of Natural and Revealed Religion," for a schoolfellow. Abandoning his first intention, he studied medicine at London, Paris, and Leyden, where he took his degree; but through the influence of several friends, and especially Butler, who had become a clergyman of the church of England, he was induced to conform, and was ordained in 1723. He became greatly distinguished as a preacher, and in 1732 was made a king's chaplain and rector of St. James's, Westminster; afterward bishop of Bristol and of London, and dean of St. Paul's; and in 1758 archbishop of Canterbury. His collected works comprise sermons, lectures, and charges (6 vols. 8vo., London, 1811).

SECOND, the 60th part of a minute, whether of an hour or of a degree. The minutes, being the first divisions of these units, are called in the old mathematical treatises "primes," and were marked thus ', the seconds (*minuta secunda*) thus ". The next sexagesimal division was called thirds. The time divisions are now commonly marked m. and sec. For one derivation of the term second see SCRUPLE.

SECOND ADVENTISTS, or ADVENTISTS, a religious sect who believe in the speedy second advent of Christ and the end of the world. They owe their origin as a body in the United States to William Miller. (See MILLER, WILLIAM.) Under his preaching and that of some of his followers, the number of adherents to the denomination rapidly increased. The time at which they at first expected the second appearing of Christ was Oct. 1842, and subsequently some of them have fixed upon different dates, among others 1843, 1847, 1848, 1857, and 1861. In 1840 Mr. Joshua V. Himes, one of their preachers, commenced the publication in Boston of a semi-monthly journal in advocacy of their views, called the "Signs of the Times and Exposition of Prophecy," and two

years later changed it to a weekly, called the "Advent Herald," which had a very large circulation. The number of members continued to increase, notwithstanding the repeated errors into which they fell in regard to the date of the second advent. After the death of Mr. Miller (1849) there was some division in their views, a part holding to some modification of the usual Trinitarian view of the divinity of Christ, and some of them adopting the doctrine of the annihilation of the wicked; while the remainder adhered to the usual views of Trinitarians, except as to the second coming of Christ, which they believe will be speedy and pre-millennial, and that the first resurrection, that of the righteous, will then occur, while the wicked will not be raised till 1,000 years later; that during this thousand years he will reign on the earth, and while his reign will be a period of happiness for the righteous, it will be one of terror and judgment for the wicked. The Adventists have no hierarchy, their churches being entirely independent, and generally receive their members by immersion on a profession of faith. They have now 4 or 5 periodicals, an extensive denominational literature, and it is said nearly or quite 160,000 members in Great Britain, British America, and the United States.

SECOND SIGHT (Gaelic, *taish*), a faculty which some persons in the Scottish highlands are believed to possess of seeing distant or future events as if actually present. These seers belong to no particular class or lineage, and the faculty is said to be developed and exercised without any volition on their part. When a vision occurs to them, their eyelids are erected and their eyes continue staring until the object vanishes, and sometimes the seer falls into a swoon. They judge of the time when the occurrence to which the vision relates will take place by the time of day at which it is seen; if early in the morning, it will be accomplished in a few hours afterward; if at noon, that very day; if in the evening, that night; if in the night, according to the lateness of the hour, in days, weeks, months, and sometimes years. A shroud seen about a man is to them a sign of death. If the shroud be not above the middle of the person, the death, they say, will not take place for a year; but if it be around the upper part of the body, death may be expected in a few hours or days. These seers are generally illiterate persons, and the possession of the faculty is not desired by them nor held in good repute by the common people.

SECRETARY (Lat. *secretarius*, from *secretum*, a secret), literally, a person intrusted with the secrets of another, and employed by him to write letters or other documents. The term also designates a public officer intrusted with the management of some department of government, or the recording officer of a deliberative assembly. Ministers of state were first called secretaries in France, where about the middle of the 14th century the title of *secrétaire des finances* was conferred upon the 3 clerks of the

privy council. In 1547 these officers were styled *secrétaires d'état*. In England the title is as old as the reign of Henry III., although for several hundred years "the king's chief secretary" or "principal secretary," as he was called, performed only clerical duties, the chief of which appears to have been the custody of the king's signet. In the reign of Henry VIII. the office was divided between two persons, both of whom under Elizabeth were members of the privy council, while one seems to have been known as "her majesty's principal secretary of state." Gradually the office became invested with executive functions, and after the restoration the principal secretaries of state were recognized as important members of the government. The number has varied at different times; there are now 5 principal secretaries of state, namely, one for foreign affairs, one for home affairs, one for war, one for the colonies, and one (created in 1858) for the management of Indian affairs, all of whom are members of the cabinet and of the privy council, and must also hold seats in parliament. Each of the 4 first named is assisted by 2 under secretaries; the secretary for India has one under secretary and the assistance of a council. In the United States, 5 of the departments of government, viz., of state, the treasury, war, the navy, and the interior, are presided over by *secrétaires* appointed by the president with the concurrence of the senate, and who, with the post-master-general and attorney-general, form the cabinet. In the different state governments there is generally a secretary of state, who performs functions similar in many respects to those of the same officer under the federal government. A secretary of legation is an officer attached to an embassy, who in the absence of his principal has full diplomatic powers.

SECRETARY BIRD, a bird of prey of the harrier sub-family, and genus *serpentarius* (Cuv.) or *gypogeranus* (Ill.). The bill is moderate, broad, elevated at the base, and the culmen much arched to the hooked tip; nostrils with large and oblique lateral opening; wings long, with the 8d, 4th, and 5th quills nearly equal and longest, armed on the wrist joint with an obtuse spur; tail very long and wedge-shaped, with the 2 middle feathers prolonged; tarsi much lengthened, slender, covered in front with transverse scales; toes very short, the anterior ones united at base by a membrane, the hind one rather elevated, and all covered above with transverse scales; claws nearly straight and blunt; the lores and space round the eyes naked. The best known species is the *S. reptilivorus* (Daud.), about 8 feet in length, inhabiting the sandy plains of S. Africa; the general color is bluish gray, the quills, thighs, crest, and abdomen more or less marked with black; the throat and chest shaded with white, and lower tail coverts reddish; cere and naked parts yellow; it has a long erectile crest on the back of the head, looking when depressed like a pen stuck behind a clerk's ear, whence the common name;

it is also called serpent eater from its favorite food, and messenger from its long steps and rapid gait. These birds are usually seen in pairs, and are very useful in destroying serpents and other reptiles, which they devour; when attacking a serpent they approach with one wing extended and acting as a shield to the body, and with the other strike the reptile, wounding it with the wing spur, tossing it into the air, and safely wearying out the most venomous species; they also eat lizards, tortoises, rats, small birds, and large insects. They run and hop very swiftly, taking wing only when not otherwise able to escape; they are very voracious, Le Vailant mentioning that he took from the crop of one 11 good-sized lizards, 3 serpents as long as his arm, 11 small tortoises ("many of which were about 2 inches in diameter"), and a number of insects, so that its specific name was well bestowed by Daudin. Their services are so highly esteemed that they are often introduced, partly domesticated, into poultry yards to rid them of rats, snakes, and other animals which devour young birds or eggs, and they rarely attack the fowls while supplied with reptiles and meat; the French tried to introduce this bird into the island of Martinique, to destroy the venomous *trigonocephali* (like the copperhead and moccasin snake) which there abound; they thrive very well in western Europe in zoological gardens. The nest is made on trees, and is of large size, built of sticks and lined with wool and feathers; they lay 2 or 3 eggs. This bird in its long tarsi resembles the waders, and has been placed among them by Vieillot, and among the *gallinae* by others on account of the wing spurs and terrestrial habits; but the details of internal structure show it to be a raptorial bird; it comes, however, nearer the vulture than the falcon family in the naked cheeks, loose plumage about the head, straightness and bluntness of the claws, and greater webs between the toes. The length of the tarsi in this bird and in the waders indicates simply an adaptation for similar habits and habitats, and not any general structural affinity; it is a good instance to show that an analogous mode of life and place of resort may give rise to an analogous external conformation in certain parts without affecting the internal structure; the soft and yielding surface of the dry sands on which this bird seeks its prey requires the long legs and partially webbed toes so necessary for the waders which frequent moist and muddy places; but as the same length is not demanded for the inhabitant of the desert and the marsh, we find the legs in the former plumed to the upper end of the tarsus, and in the latter to a much less distance. In the system of Vigors and Swainson this bird would form one of the connecting links between the birds of prey and the waders. A species is found in the Philippine islands, which is probably distinct from the African bird.

SECRETION, the process by which various fluid materials are separated from the blood,

generally by glandular organs, for use within the body, or for the purpose of being discharged as products whose retention would be injurious; the materials thus separated are also called secretions. The term is sometimes restricted to such as have a use in the system, as the tears, saliva, milk, the mucous and serous fluids, and some fatty matters; while those intended to be discharged as excrementitious are called excretions, like the carbonic acid of the lungs, the urine, perspiration, and, to a considerable degree, the bile. In all forms of true secretion the materials are selected from the blood by the agency of cells, as noticed under GLAND. Though each glandular organ has its independent action, in virtue of the specific endowments of its component cells, and is no more directly dependent on the nervous system than are the organs connected with nutrition, still almost every secretion is affected by states of the mind, operating of course through the nerves, and chiefly through the ganglionic system. The products of the secretory processes move through the efferent ducts by the contractility stimulated by their presence. Secretion may continue a certain time after death, as in the poison apparatus of the rattlesnake. Complementary relations exist between the excretions, which may to a certain extent perform each other's offices; the more active the excretion of carbonic acid by the lungs, the less is the amount of bile secreted; on the other hand, if respiration be inactive from indolence or heat, without a corresponding diminution of food, the increased flow of bile, from the imperfectly oxygenized matters in the blood, produces diarrhoea; when the liver is inactive, increased respiration from exercise in cold air gives relief; the connection between the excretions of the kidneys and skin has been noticed under KIDNEY. Remarkable metastases of the urinary secretion to the glands, skin, and serous membranes are well authenticated; so the characteristic biliary matter is often detected in the urine, perspiration, milk, and other secretions. The source of the secretions is in the constant decomposition and decay of the body in virtue of its chemical constitution, and as a necessity of vegetative existence and the exercise of the animal functions. Secretions generally serve a double purpose in the system; for instance, the bile not only removes what if retained would be a positive poison, but also aids in digestion; the cutaneous excretion removes superfluous water from the blood, and regulates the temperature of the body. The urine in some animals is used as a means of defence, and so are the special poisonous secretions of the venomous serpents and stinging articulates; even the saliva may be so modified, as in rabid animals, as to be a deadly poison when introduced into a wound. In their intimate nature, the selective acts of secretion are not different from those of nutrition. Other information on secretions will be found under DIGESTION, LIVER, LUNGS, MEMBRANE, PERSPIRATION, RESPIRATION,

SKIN, and URINE; for details the reader is referred to the article "Secretion," by Carpenter, in the "Cyclopædia of Anatomy and Physiology" (1852), and to the various physiological writings of that author.

SECTOR, in geometry, the portion of the area of a circle included between two radii and an arc. The instrument called by this name represents this figure, and is used for solving mechanically numerous questions of proportions in geometry and trigonometry. From its adaptation to this use it is called by the French the compass of proportion. It is made of two strips of ivory, wood, or metal, each of them 6 inches or a foot long, and is hinged in the centre like a carpenter's rule. The pivot represents the centre of the circle, and the lines drawn from it upon the two limbs the radii. Upon these lines are drawn the several scales specially adapted to the sector. Other scales not directly belonging to it may be placed in the blank spaces on the limbs. The scales for the radial lines are selected and arranged according to the particular uses for which the instrument is intended. They commonly consist of a line of chords by which we may protract an angle of any given number of degrees, find the degrees corresponding to any given arc, &c.; a scale of equal parts, which affords the means when the limbs are opened to the proper extent of finding with a pair of dividers a 8d proportional to 2 given lines, or a 4th to 3 given lines, &c.; also lines of sines, secants, tangents, and polygons. The sector is a convenient instrument in plotting for giving without calculation angles and the lengths of required lines; but all instruments of this kind are necessarily imperfect, and since the introduction of logarithmic tables this is now little used. It is supposed to have been invented about the year 1568 by Guido Baldo or Ubaldo. It was described by Gaspar Mordente at Antwerp in 1584, who refers its invention to his brother Fabricius in 1554. Several treatises were written upon it in Strasbourg and London near the close of the 16th century. Galileo wrote upon it in 1607, and claimed its invention.—An instrument called the astronomical or equatorial sector is used for taking the difference of right ascensions and declinations of stars; and the zenith sector employed on trigonometrical surveys is used to determine the zenith distances of stars whose declinations differ but little from the latitude of the observer.

SECLAR GAMES, in Roman history, games celebrated at long and irregular intervals, and not, as their name would seem to indicate, once in every century or *seculum*. Under the republic they were known as the Tarentine games, from a place in the Campus Martius, called Tarentum, where they were celebrated, and appear to have been instituted about the time of the consul Valerius Publicola. Nothing is known of their origin beyond the fact that they were celebrated in honor of Pluto and Proserpine for the purpose of averting from

the state some great calamity. Down to the time of Augustus they were held but 8 times; they were revived by that emperor in 17 B. C. with considerable pomp, occupying 8 days and nights, and being accompanied by sacrifices to Jupiter, Juno, and all the superior deities. For this occasion Horace wrote his *Carmen Seculare* in honor of Apollo and Diana, sung by a chorus of youths and virgins. The secular games were celebrated on 8 subsequent occasions, viz.: in the reign of Claudius in A. D. 47, in that of Domitian in 88, and in that of Philip in 248, exactly 1,000 years after the building of the city.

SECUNDUS, JOHANNES. See JOHANNES SEUNDUS.

SEDAINE, MICHEL JEAN, a French dramatist, born at Paris in 1719, died there, May 17, 1797. In his youth he was a stone cutter. He first published some short poems which were well received by the public, especially his *Épître à mon habit*. He began in 1756 to write for the *opéra comique*, whose manager was his friend. He also wrote for the Italian theatre, *Le diable à quatre* (1756), *Le jardinier et le seigneur* (1761), *Le roi et le fermier* (1762), and *Rose et Colas* (1764). *Aline, reine de Golconde*, produced in 1766 at the royal academy of music, was another successful piece in a higher order of composition. In 1775 he had brought out at the *théâtre Français* a 5-act drama entitled *Le philosophe sans le savoir*, which is still ranked among the masterpieces of the French stage. This was followed in 1768, at the same theatre, by *La gageure imprévue*, after which he produced at the Italian opera *Le déserteur* (1769), *Félix ou l'enfant trouvé* (1777), *Aucassin et Nicolette* (1780), *Richard Cœur de Lion* (1784), and *Le faucon* (1792); and at the academy of music *Amphitryon* (1788) and *Guillaume Tell* (1791). He was admitted to the French academy in 1786. His *Œuvres choisies* were published by Auger (3 vols. 8vo., Paris, 1818).

SEDAN (anc. *Sedanum*), a fortified town of France, department of Ardennes, situated on the right bank of the Meuse, 160 m. N. E. from Paris; pop. in 1856, 18,304. Marshal Turenne was born in a chateau still standing near the town. The manufactures are extensive, and consist principally of fine black cloths and cassimeres, linen, hosiery, leather, arms, and hardware. Sedan was formerly the capital of a principality, which in 1591 came into possession of the Turenne family, who in 1641 ceded it to France. It had a celebrated Protestant university, which was suppressed on the revocation of the edict of Nantes. The chairs commonly known as sedans took their name from this town, from which they were introduced into England in 1581, though they did not come into general use till 1649.

SEDGE (*carex*, Linn.), a large genus of herbaceous, perennial, endogenous plants, found in the more temperate and colder regions of the globe, and belonging to the natural order

of *cyperaceae*. At first aspect the sedges resemble the grasses, but in structure there are essential differences. Their stems are angular instead of fistulous, destitute of diaphragms at the joints, and their floral envelopes are reduced to a bract and 2 opposite glumes. The leaves, which are of various lengths, some upon the stem and others near the root, are linear, carinate, and rough on the margins and keel; the flowers are borne in spikes, that are terminal and axillary, mostly bracteated at base; they are of two kinds, and the species may be monœcious, when the barren and fertile florets are found on the same plant, or androgynous, when in different parts of the same spikes, or rarely diœcious, when one individual produces barren and another fertile flowers only. The stamens are 3 in number, and the pistils are either 2, in which case the seed vessel (*achenia*) will be lenticular, or 3, when it will prove triangular. The sedges are found growing in large tufts or tussocks in bogs, or in patches on warm sunny hillsides, or singly in moist shady woods, or even on exposed alpine heights. The number of species known to botanists probably exceeds 300, and those which are exclusively North American are numerous. Economically they are of little known use; many are cut with other grasses and form part of the coarse fresh hay of the wet meadows, and a few are variously employed for thatching, mats, and similar uses. On the coasts of Europe the shifting sands are sometimes arrested by artificial planting of *carex arenaria*, and its roots with those of some others are fraudulently mixed with sarsaparilla. The sedges of America have been elaborated by Torrey, Dewey, Carey, Tuckerman, and Boott, and the number of known species throughout North America is constantly on the increase.

SEDGWICK, ADAM, an English clergyman and geologist, born in Dent, Yorkshire, in 1786. He was graduated at Trinity college, Cambridge, in 1808, became in the following year a fellow of the same college, and in 1818 succeeded Professor Hailstone as Woodwardian professor of geology in the university. Between 1829 and 1832 he was president of the geological society of London. As a geologist he has given his attention chiefly to the study of the palæozoic and crystalline rocks of England and Wales. He contributed to McCoy's descriptive catalogue of the "British Palæozoic Fossils," contained in the university museum collection, "A Synopsis of the Classification of the British Palæozoic Rocks." His remaining geological writings consist of between 30 and 40 papers published in the "Transactions" of various societies, and in scientific periodicals. He is the author of a "Discourse on the Studies of the University of Cambridge," originally delivered as a sermon at Trinity chapel, but expanded in the 5th edition (1850) into a volume.

SEDGWICK. I. THEODORE, an American statesman and jurist, born in Hartford, Conn., in May, 1746, died in Boston, Mass., Jan. 24,

1813. He was descended from Robert Sedgwick, a major-general in Cromwell's army, and who was in 1655 appointed by the protector one of the commissioners for the government of Jamaica. Having lost his father at the age of 13, Theodore was aided by his elder brother John to obtain an education in part at Yale college, but without finishing his course, having been rusticated for a boyish misdemeanor. He then began the study of divinity, but soon exchanged it for that of the law. In April, 1766, he was admitted to the bar, and commenced practice at Sheffield, Berkshire co., Mass., which he represented several times in the Massachusetts general court. Notwithstanding a strong attachment to the mother country, which he never outlived, he engaged in the revolution with zeal, and in 1776 served as aid to Gen. Thomas in the expedition to Canada. Afterward he was actively engaged in procuring supplies for the army. About the close of 1785 he removed to Stockbridge, and in that year and the next was a member of the continental congress. In the winter of 1787 he took a leading part in the suppression of Shays's rebellion, incurring the especial enmity of the insurgents, who frequently threatened his life, and by whom his house was attacked during his absence in the legislature. In 1788 he was a prominent member of the Massachusetts convention which ratified the federal constitution, and in the same year was a member and the speaker of the house of representatives of the state. In 1789 he was elected to the lower house of the first constitutional congress, where he remained by successive elections till March, 1796, when he was chosen U. S. senator, which office he held 3 years. At the beginning of the 6th congress he returned to the house of representatives, and was chosen its speaker. In 1802 he was appointed to the bench of the supreme court of Massachusetts, where he remained till his death. His judicial opinions are remarkable for clearness and elegance. Judge Sedgwick was an active member of the old federal party, and was intimately associated with Hamilton, Jay, Rutledge, Ames, King, and its other leaders. He was ardently hostile to slavery. Shortly after the adoption of the Massachusetts constitution, Elizabeth Freeman, a negro woman of extraordinary character and intelligence, belonging to a Mr. Ashley of Sheffield, having fled in consequence of ill treatment, and steadily refused ever to return, her master sued to regain his slave. She was defended by Judge Sedgwick, and by the decision of the court pronounced free. This, it is believed, was the first fruit of the declaration in the Massachusetts bill of rights that "all men are born free and equal," and led to the end of slavery in Massachusetts. The case of *Greenwood vs. Curtis* ("Massachusetts Reports," vol. vi.), tried while he was on the bench, was an action by a resident of a southern state to recover a balance of account on a contract which had been made with the defendant,



through an agent at Rio Pango on the coast of Africa, for the delivery of slaves in exchange for goods. The court, in Judge Sedgwick's absence, pronounced for the plaintiff. On his return, following the principles declared by Lord Mansfield in the case of *Somerset*, he held in an elaborate dissenting opinion, which has since been regarded as of great weight, that by the law of nature, which on this question remained the law of Massachusetts, one man could not have a legitimate property in another, and that the contract in question was therefore *malum in se*, and void. II. THEODORE, an American lawyer and writer, the eldest son of the preceding, born in Sheffield, Mass., in Dec. 1780, died in Pittsfield, Nov. 7, 1839. He studied law with his father at Stockbridge, and on his admission to the bar in 1801 removed to Albany, N. Y., where he entered into a professional partnership with Mr. Harmanus Bleecker, afterward U. S. *chargé d'affaires* at the Hague, which continued until 1821, when, in consequence of impaired health, he retired from his profession to his family home at Stockbridge, where he resided through his remaining life. Mr. Sedgwick was ready and effective both as a forensic and popular speaker, and enjoyed a successful practice as well as a high position at the bar. On his retirement he interested himself in agriculture, and was repeatedly chosen president of the agricultural society of the county. He several times represented his town in the state legislature, and was for some years the candidate of the democratic party for lieutenant-governor; he was also their candidate in Berkshire for congress. In 1827 he introduced into the state legislature a project of a railroad across the mountains from Boston to Albany, which at the outset was generally derided as visionary, but which after years of undaunted efforts he succeeded in carrying through. He was earnestly devoted to the causes of free trade, temperance, and anti-slavery. His economical views are plainly and practically set forth in his work entitled "Public and Private Economy, illustrated by Observations made in Europe in 1836-'7" (3 vols. 12mo., New York, 1838). He had previously in 1826 published anonymously a little book called "Hints to my Countrymen." He died of a stroke of paralysis after the delivery of an address to the democratic citizens of Pittsfield. III. SUSAN RIDLEY, wife of the preceding, is descended from the old English border family which ranks among its members the celebrated Bishop Ridley. Her mother was the second daughter of William Livingston, governor of New Jersey. Mrs. Sedgwick is the authoress of various tales for children, and more recently of several longer works of fiction. Her principal publications are: "The Morals of Pleasure" (1829); "The Young Emigrants" and "The Children's Week" (1830); "Allen Prescott" (1834); "Alida" (1844); and "Walter Thornley" (1859). Mrs. Sedgwick still (1861) resides at her husband's paternal

home in Stockbridge. IV. CATHARINE MARIA, an American authoress, daughter of Judge Theodore Sedgwick, born in Stockbridge, Mass., near the close of the 18th century. Having at the solicitation of her brother Henry, who early perceived and encouraged her talents, consented to the publication of her first story, called "The New England Tale," it appeared anonymously in 1822, and its success determined her course. Owing perhaps in part to its local allusions and to its life-like portraiture of the New England character, then little described in print, it had an immediate and wide popularity. In 1824 she published "Redwood," which, after being republished the same year in England, was translated into French, Italian, and Swedish. In 1827 she produced "Hope Leslie, or Early Times in America," the freshness and grace of which, together with its peculiar interest as an original tale, made it one of the most popular of American novels. This was followed in 1830 by "Clarence, or a Tale of our Own Times," and in 1832 by "Le Bossu," a shorter story for young people. In 1835 she published "The Linwoods," a romance of the revolution, and in the same year a collection of short tales. In the following 8 years appeared a series of popular books, "The Poor Rich Man and Rich Poor Man," "Live and Let Live," "Means and Ends," "Home," and "Love Token for Children." In 1837 the life of Lucretia Maria Davidson, by Miss Sedgwick, appeared in Sparks's collection of American biography, to which the life of the sister Margaret, written soon after by Washington Irving, formed a counterpart. In 1841, on returning from a European visit, she published "Letters from Abroad to Kindred at Home;" in 1845 "Wilton Harvey and other Tales;" and subsequently "Morals of Manners," designed for very young persons. The latest of her novels, "Married or Single?" appeared in 1857. In the succeeding year she published in a small duodecimo the life of Joseph Curtis, an honored citizen of New York to whom the cause of public education was largely indebted. Beside the list enumerated, she has written for magazines many tales, which have not been collected. Miss Sedgwick is distinguished by her strong common sense, and by a graceful and captivating style. Her tender fondness for children, making, as it has done, her writings for them a labor of love as well as of great usefulness, has added a magnetic charm to the solid value of these publications. She still resides in her native county of Berkshire. V. THEODORE, an American lawyer and author, son of Theodore Sedgwick, 2d, born in Albany, N. Y., Jan. 27, 1811, died in Stockbridge, Mass., Dec. 9, 1859. He was graduated at Columbia college, New York, in 1829, and admitted to the bar in May, 1838. The next 15 months he passed in Europe, chiefly at Paris, where he was attached to the legation and family of Edward Livingston. On his return home he commenced professional practice in New York, which he prosecuted with great

industry and success till about 1850, when ill health compelled him in some degree to suspend his exertions, and they were not again more than partially resumed. During this most active period he produced his "Treatise on the Measure of Damages, or an Inquiry into the Principles which govern the Amount of Compensation recovered in Suits at Law" (New York, 1847; 2d ed., 1852), which at once took its place among standard authorities in America and in England. He made several other visits to Europe, and in 1850 a considerable continental tour. In 1857 he published his "Treatise on the Rules which govern the Interpretation and Application of Statutory and Constitutional Law," an extensive and elaborate work, which has met the approval of the bar and bench, as well as of legal critics and writers, at home and abroad. On the accession of Mr. Buchanan to the presidency, Mr. Sedgwick was offered the mission to the Hague, and afterward was twice tendered the office of assistant secretary of state under Gen. Cass; but both these he declined, preferring the expectation of being able to resume his former professional activity. In Jan. 1858, he received an unsolicited appointment as U. S. attorney for the southern district of New York, which he accepted and held till the time of his death. Mr. Sedgwick wrote much and often on political, professional, and miscellaneous topics. In 1833 he published a biographical memoir of his maternal grandfather, William Livingston, governor of New Jersey. He also edited a collection of the political writings of William Leggett (2 vols. 8vo., New York, 1840). Various addresses by him have been printed, the latest being a discourse delivered before the alumni of Columbia college, New York, in 1858, in which he insists on the practical advantages of a course of the natural sciences over the usual classical curriculum.

SEDLEY, SIR CHARLES, an English poet, born in Aylesford, Kent, in 1639, died Aug. 20, 1701. He was the son of Sir John Sedley, and after the restoration went to London, where according to Wood he set up for a satirical wit, a comedian, poet, and courtier of ladies. He soon obtained great favor with Charles II., and retained it by never asking any favors, but his private fortune was wasted in debauchery. In company with Lord Buckhurst and Sir Thomas Ogle, he was once engaged in a riot at a public house, where he made a speech to the mob, naked, from the balcony, and in consequence was fined £500 by Chief Justice Hyde. He now applied himself to serious business, and distinguished himself in parliament by his opposition to the unconstitutional efforts of James II. His activity in bringing about the revolution is attributed to the king's intrigue with his daughter, who became his mistress and was created countess of Dorchester. When he was taxed for his want of loyalty, he replied: "I hate ingratitude, and therefore, as the king has made my daughter a countess, I will endeavor

to make his daughter a queen." His works were published in 1722, with a memoir. They consist of speeches in parliament, amatory poems, translations from the classics, and plays. His poems are marked by ease and elegance of expression, and a very refined licentiousness.

SEDUCTION, the persuading a woman to surrender her chastity. It has been often made a reproach to the common law that it does not regard the seducer as a criminal, or at least hold him to a direct responsibility. The French and Prussian codes, also, composed as they have been by the deliberate act of the lawgivers, though, like the Roman laws, they throw the strongest defences against violence around the chastity of woman, yet denounce no penalties against the mere seducer. But though the common law does not indeed hold the seducer to any direct responsibility, yet indirectly it does reach and punish him. The seducer who renders a female servant incapable of her usual labor and service is bound to make indemnity. This is the principle and basis of almost all suits for seduction; they are actions on the case, and rest immediately on the loss of service consequent upon the seduction. By a fiction of the law the relation of master and servant is conceived to exist between parent and child, and thus a father may have an action for the seduction of his daughter. The father may also found his suit on the seducer's illegal entry upon his premises, and may then state the seduction and loss of service in aggravation. But it is essential to this mode of proceeding that the daughter lived with the father at the time of the seduction, and it is therefore inapplicable to very many cases. In the more usual form to which we have referred, namely, of case, the consequential injury being the ground of action, it is unimportant whether the seduced lived with the father at the time of the seduction or not.—It is now the general rule that exemplary or punitive damages are properly given in such a case, and the amount of them is very much in the discretion of the jury. One of the earliest cases in which such damages are recommended by the court is a case of the year 1800, in which Lord Eldon, at that time chief justice of the common pleas, told the jury they were to regard not merely the loss of service but the wounded feelings of the parent. In 1805, Lord Ellenborough said that redress was to be given to the father not only for his loss of the society and comfort of his child, but also for the dishonor which he receives; and in 1811 the same learned judge said that, though it was difficult to conceive on what legal principle the damages could be extended beyond the injury resulting from loss of services, yet the practice was now inveterate and could not be shaken, and that the feelings of parents and of those who stood *in loco parentis* were always to be taken into consideration. Chief Justice Tindal told a jury in 1837 to consider the distress and anxiety of the plaintiff, a mother. In Indiana, in a late

case, the court charged the jury that, though evidence of a loss of service was essential to the suit, yet other circumstances, such as the seduction itself and the previous respectability of the plaintiff's family, might be admitted to increase the damages.—In all cases then, however the damages may be increased by other considerations, some loss of service must always be alleged in the declaration and proved. The English law requires that the actual relation of master and servant shall have existed between the plaintiff and the person seduced at the time of the seduction; so that where a daughter under age was seduced by her master, while living in service away from her father's house with his consent, and with no intention of returning to it, the father was held to have no ground of action. The rule is not so strict in the United States; and in a leading case in New York, where a daughter under age, with the consent of her father, lived with her uncle, who agreed to pay her for such work as she chose to do, but made no agreement with her for any fixed time of service, and while in her uncle's house she was seduced and returned to the house of her father, who paid the expense attending her confinement, it was held that, as the father had made no contract binding out his daughter, he could still control her services; the fact that the daughter had no intention of returning could not affect the father's right; she was his servant *de jure*; and as the defendant had done an act which deprived the father of services that he had the right to exact, he must respond in damages. So where a father told his daughter that she might remain at home or go out to service as she pleased, but if she left her home she must take care of herself, and he relinquished all claims to her wages and services, it was held that, as the father had nevertheless the right to revoke his license at any time, the legal relation of master and servant was not dissolved, nor his personal rights over his daughter abandoned, and he could maintain the action for seduction.—The father's legal right to the services of his daughter extends to her majority, namely, to the age of 21 years. If she be living with her father during her minority, proof of this fact alone suffices to maintain the issue in respect to the fact of service; service is presumed. If however the daughter is already of full age, there must be proof of service in fact rendered to the father. Proof of very slight service suffices, if she is still living with him; but if she is absent from home under a contract made by herself since attaining her majority, the father has no right of suit. His action, however, will not be defeated if the defendant hired the daughter for the purpose of getting her into his possession and out of the father's control, even though she were of full age at the time of the hiring, provided she were then living in her father's family. The hiring being fraudulent and therefore null, the relation of master and servant was never contracted between the daughter and her seducer,

and so was never interrupted as between her and her father.—The action may be maintained by any one who stands *in loco parentis* (as the technical phrase is), or in the place of a parent, by a guardian, for example, or by a relation who has adopted the female as his own child, in the same cases and under the same conditions that give a cause of action to the natural parent. In a case in the New York court of appeals, overruling a decision of the court below, it was held that an action could not be maintained by a stepfather for the seduction of his stepdaughter while in the service of a third person, although the daughter returned to the stepfather's house and engaged in his service, and was there confined. The stepfather is not legally entitled to the service of a stepdaughter. Finally it seems that a mother cannot maintain an action for the seduction of her daughter during the father's life, though the child be not born until after the father's death. There must be an actual or constructive right to the daughter's service at the time the injury is committed, that is to say, at the time of the seduction. If the relation of master and servant first arises after the injury has been done, there is no more ground to claim indemnity for the resulting loss of service than there would be to claim it for the incapacity of a man servant who had been disabled by a beating before the time of the hiring.—Upon the trial of the cause, the fact of the seduction may be proved by the woman herself. Her general character for chastity is considered to be in issue, and may be impeached by general evidence on the part of the defendant, and be supported by the plaintiff in like manner. But though the evidence discloses the woman's previous criminality with others, it will avail nothing if the jury are satisfied that the defendant is the father of her child, and so the cause of the plaintiff's loss of service. It has been held, that if an attempt be made by the defendant to destroy on trial the good character of the seduced woman, and this attempt be defeated, the making the attempt may be regarded by the jury in estimating damages; and so indeed may all circumstances which aggravate the seduction, and increase the harm caused by it.—The New York statute respecting seduction was enacted in 1848. It makes indictable "any man who shall, under promise of marriage, seduce and have illicit connection with any unmarried female of previous chaste character." No conviction shall be had under the provisions of this act on the testimony of the female seduced, unsupported by other evidence, nor unless the indictment shall be found within two years after the commission of the offence. Upon conviction, the seducer shall be punished by imprisonment in a state prison not exceeding five years, or by imprisonment in a county jail not exceeding one year. In respect to the promise of marriage, which the statute renders an essential condition of the action, it has been held not necessary to aver a mutual or valid

promise. It is therefore immaterial that the seducer is a married man, and so incapable of performing his promise, provided the woman was ignorant of this fact. A previous chaste character is also an essential element of the cause of action, and it has been construed to mean that the female shall have possessed actual personal virtue. In Pennsylvania an act of 1843 provides that every person who shall be convicted of the seduction of any female of good repute, under 21 years of age, under promise of marriage, shall be sentenced to pay a fine not exceeding \$5,000, and shall also be put to hard labor in the penitentiary for a period not less than one nor more than three years. The promise of marriage is not to be deemed established unless the testimony of the female seduced is corroborated by other evidence positive or circumstantial. There are statutes of similar purport and intent in Michigan and Wisconsin, and some other states.

SEED, the regular perfect reproductive agent in phenogamous plants by which species and varieties are perpetuated. The centre of fertile flowers contains a hollow organ called the ovary, and this covers a number of small excrecent growths composed of a delicate tissue, which are the ovules. After impregnation by means of the pollen these ovules rapidly increase in size and undergo many modifications which end in the production of the seeds. Within each seed is the embryo or young plant, consisting of a radicle, plumule, and cotyledons; and while developing itself, the membranes which surround it frequently store themselves with albumen or starchy matters to be used by the embryo while in the process of germination. In some species the cotyledons contain the albumen, and for the same purposes. The ripened seed is protected by several external envelopes called the testa, perisperm, or spermoderm, consisting of the hardened membranes which enclosed the ovule. A small eye or scar (*hilum*) upon the side of the seed indicates where the umbilical cord (*funiculus*) proceeding from the partition of the ovary (*placenta*) was attached to the seed. The funiculus in the nutmeg enlarges itself into the aril and envelopes the seed, forming the mace of commerce; in the spindle tree it enlarges into an investing brilliant-colored mantle or cloak. Seeds are smooth or rough, sculptured or embossed, marked by veins, depressions, and elevations; and their testæ present much beauty in these particulars as well as in their colors and tints. They may be enveloped in fleecy substances, like the cotton, or bristly and hairy, or furnished with *alæ* or projections like wings, as in the *bignoniaceæ*. Many families of plants have small fruits or sorts of nuts so similar to seeds as to be ordinarily called by that name, but careful examination shows the presence of pericarpal coverings. In the *conifera* and *cycadaceæ*, however, neither the seed nor the ovule is ever invested with any covering, and on these extraordinary exceptions Robert

Brown founded excellent natural characters in those two orders.

SEELAND (Dan. *Sjælland*), the largest and most important island of Denmark, bounded N. by the Cattegat; E. by the Sound, separating it from Sweden; S. by the Baltic, separating it from the islands of Falster, Moen, and Lolland; and W. by the Great Belt, separating it from the islands of Langeland, Fünen, and Samsø; length 81 m., breadth 66 m.; area, 2,131 sq. m.; pop. about 500,000. It is irregular in shape and much indented by arms of the Baltic on the S. W. shores, and in the W. an arm of the Cattegat extends far into the interior. The surface is generally flat. The soil is an extremely fertile alluvium resting on beds of mussel shells and corallines. The chief product is grain. Extensive forests once covered the island, but timber is now comparatively scarce. The climate is humid and milder than that of other places in the same latitude. The largest river, the Suus-åne, is very crooked and only 50 m. long. Minerals are scarce. Copenhagen, the capital of Denmark, situated on the E. coast, is the principal city. A railroad, traversing the island, connects that city with Roskilde, Sørøe, and Corsoer on the Belt. Kronborg, the fort of Elsinore on the sound, opposite Helsingborg in Sweden, commands the entrance of that channel.

SEETZEN, ULRICH JASPER, a German traveller and naturalist, born at Sophiengröden, Oldenburg, Jan. 30, 1767, died near Taas, Yemen, in 1811. He was educated at Göttingen, spent a year at Vienna and Constantinople in preparations for a journey through Asia, and left the latter city for Aleppo in Syria, remained there 15 months engaged in the study of Arabic, and afterward visited the principal parts of Palestine, the deserts of Arabia, Mount Lebanon and the Antilibanus (1805), the country E. of Hermon, the Jordan, and the Dead sea, where he discovered the sites of several ancient cities, the isthmus of Suez, and Egypt. He remained in Egypt two years, and collected numerous MSS., antiquities, and zoological and botanical specimens for the museum of Gotha. In 1808, having conformed outwardly to the Moslem faith, he went by sea to Jiddah, and thence to Mecca and Medina. In 1810 he set out for Mocha, and a letter dated Nov. 17 of that year is the last authentic account ever received of him. A letter to Von Hammer, written by an English gentleman at Mocha in 1815, stated that Seetzen had died suddenly at Taas in 1811, and that he was reported to have been poisoned by the imam of Sana. The same statement was subsequently received in England by way of Bombay. His diary, maps, and plans were recovered, but have never been published.

SEGOVIA, a central province of Spain, in Old Castile, enclosed by Valladolid, Burgos, Soria, Guadalupe, Madrid, and Avila; area, 2,745 sq. m.; pop. in 1857, 146,839. It belongs to the central table land of Spain, and is cross-

ed by ranges of hills and mountains, the most elevated of which is 8,222 feet high. The rivers are all tributaries of the Douro, the most important being the Rianza, Duraton, Cega, and Eresma, all of which have their sources in the Guadarama mountains, which separate the province from Guadalajara and Madrid. Granite and limestone are the prevailing rocks; and there are veins of rock crystal, quartz, and gold. Upon the lower slopes of the mountains there are pine forests, which form a great source of wealth. There are manufactures of cloths, paper, leather, earthenware, and crystal.—SEGOVIA, the capital, is situated at the junction of the Eresma and Clamores, 45 m. N. W. from Madrid; pop. 13,000. It stands upon a rocky hill, and is surrounded by old walls, with round towers at intervals, and on the summit of the cliff there is an ancient castle. The cathedral, begun in 1525, is one of the finest in Spain; it is in the florid Gothic style, and the tower is 330 feet high. The town has a mint where all the national coin was formerly struck, but where now only copper money is made. Water is brought into the town from the Sierra Fonfria, about 10 m. distant, by an aqueduct 2,921 feet long, supported by 170 arches, some of which are 102 feet in height. It was erected by the Romans in the time of Trajan, and is still in good preservation. The Moors destroyed 85 arches in 1071, when they sacked Segovia, and Queen Isabella repaired it in 1483. The town was formerly a place of considerable trade, and had extensive woollen manufactures; but the French sacked it in 1808, and occupied it till 1814, and it has never recovered from the injury thus received.

SEGUIN, ÉDOUARD, a French physician and philanthropist, born at Clamecy, department of Nièvre, Jan. 20, 1812. He was educated at the colleges of Auxerre and St. Louis at Paris, and studied medicine and surgery under Itard. Soon after he devoted himself chiefly to the treatment of idiots, and his labors attracted the favorable attention of the academy of sciences. (See IMBODY). Removing to the United States after the revolution of 1848, he settled in Ohio. In 1860 he revisited his native country, and on his return to America fixed his residence at Mt. Vernon, N. Y. He has published *Théorie et pratique de l'éducation des idiots* (Paris, 1842); *Hygiène et éducation des idiots* (1843); *Traitément moral, hygiène et éducation des idiots, et des autres enfants arriérés* (1846), the standard authority on the subject; *Jacob Rodrigues Pereira, notice sur sa vie et ses travaux* (1847); and "Origin of the Treatment and Training of Idiots" (Hartford, Conn., 1856).

SÉGUR. I. PHILIPPE HENRI, marquis de, a French soldier, born Jan. 20, 1724, died in Paris, Oct. 8, 1801. He served in Germany, distinguished himself at the battles of Rocoux (1746), where he was wounded, and Laffeld (1747), where he lost an arm; was promoted to the rank of brigadier-general, and soon after to that of lieutenant-general; took an active part in all

the campaigns in Hanover during the 7 years' war, and was finally made a prisoner at Clostercamp. On the conclusion of peace in 1763, he was appointed inspector-general of infantry. In 1780 he was made minister of war by Louis XVI., and in 1783 a marshal of France. He resigned his office in 1787. During the reign of terror he was imprisoned in La Force, and lost all his property. II. LOUIS PHILIPPE, comte de, a French diplomatist and writer, son of the preceding, born in Paris, Dec. 10, 1758, died there, Aug. 27, 1830. He entered the army when a boy, left France in May, 1782, to join the army of Gen. Rochambeau in America, and in 1784 was appointed ambassador to Russia. He became a favorite at the court of Catharina II., who admitted him to her private circle; he wrote light comedies for the performances given in the palace of the Hermitage, and these plays he afterward published under the title of *Théâtre de l'Hermitage* (1798). Having returned to France in 1789, he was made a brigadier-general in 1791, and the next year went on a mission to Prussia. During the reign of terror he managed to avoid serious molestation, employed himself in writing, and in 1800 published an *Histoire des principaux événements du règne de Frédéric Guillaume II. roi de Prusse* (3 vols. 8vo.), and in 1801 *Décade historique, ou tableau politique de l'Europe de 1786 à 1796* (3 vols. 8vo.). In 1812 Napoleon made him senator. On the first restoration he was placed on the list of peers by Louis XVIII.; but he returned to his former master during the Hundred Days, and after the battle of Waterloo desired to follow him in his exile. This he was not allowed to do, and, retiring to private life, resumed his literary pursuits. He had published during the empire his *Politique de tous les cabinets de l'Europe pendant les règnes de Louis XV. et de Louis XVI.* (3 vols. 8vo.); he now published his *Mémoires, souvenirs et anecdotes* (3 vols. 8vo., 1824), perhaps his best performance, and undertook a universal history, parts of which appeared at various times under the titles, *Histoire ancienne* (3 vols.), *Histoire Romaine* (8 vols.), *Histoire du Bas Empire* (4 vols.), and *Histoire de France* (9 vols.). The last was completed only to the end of the reign of Louis XI. He also published a *Galerie morale et politique* (4 vols.), and a volume of *Mélanges*. In 1819 he was readmitted to the house of peers, and sided with the liberal party. His *Œuvres complètes* appeared in 1824, in 80 vols. 8vo. III. PHILIPPE PAUL, comte de, a French soldier and historian, son of the preceding, born in Paris, Nov. 4, 1780. He enlisted in 1799 as a private in a hussar regiment of the consular guard. In 1806 he served under Joseph Bonaparte in Naples, and was present at the siege of Gaëta. As aide-de-camp to Napoleon in 1807, he was twice wounded and finally taken prisoner by the Russians. Being released after the peace of Tilsit, he went to Spain, became a brigadier-general in 1812, assisted in the campaign in

Russia, distinguished himself in Saxony, on the banks of the Rhine, and in the campaign of 1814 within the borders of France. He remained faithful to the emperor, and having served him during the Hundred Days, was dismissed after the 2d restoration. His leisure hours he devoted to writing an *Histoire de Napoléon et de la grande armée pendant l'année 1812* (2 vols. 8vo.), and *Histoire de Russie et de Pierre le Grand* (8vo., 1829), which led to a duel with Gen. Gourgaud. These two works caused him to be elected in 1830 to the French academy. After the revolution of July he re-entered public life, and in 1831 was made a lieutenant-general and a peer. He undertook to continue his father's history of France, and published an *Histoire de Charles VIII.* (2 vols. 8vo., 1834), but has gone no further. On the revolution of Feb. 1848, he retired to private life.

SEIDL, JOHANN GABRIEL, an Austrian poet and antiquary, born in Vienna, June 21, 1804. He became a professor in the gymnasium of Cilly in Styria in 1829, superintendent of the academy of coins and antiques at Vienna in 1840, and member of the academy of sciences in 1847. He has written numerous plays, short novels, and poems, of which his ballads and lyrical pieces are the most esteemed. A hymn which he wrote to the music of Haydn was in 1854 officially recognized as a national hymn of the Austrian empire. He is also the author of several archaeological works, and since 1850 has been one of the editors of the *Zeitschrift für die Oestreichischen Gymnasien*.

SEIDLITZ (or SEDLITZ) WATER, the product of certain saline springs in Seidlitz, a village of Bohemia, used as an agreeable and effective aperient. The solid contents in a wine pint, according to Bergman, are 192.8 grains, consisting of sulphate of magnesia, 180 grains; sulphate of lime, 5; chloride of magnesium, 4.5; carbonate of magnesia, 2.5; carbonate of lime, 0.8. The French prepare an artificial Seidlitz water by dissolving from 20 to 48 grammes of sulphate of magnesia in 3 times its weight of water, and, after filtering, introducing it into a bottle, which is then filled with water charged under pressure with carbonic acid gas. (See SELTZER WATER.) It is said to be preferable to the natural water, and may be preserved thus charged in tightly stopped bottles.

SEIDLITZ POWDERS. See ROCHELLE SALT.

SEINE (anc. *Seguana*), a river of France, rising in the department of Côte d'Or, in the heights of Langres, flowing first N. W., then W. S. W., and again N. W., through the departments of Aube, Seine-et-Marne, Seine-et-Oise, Seine, Eure, and Seine-Inférieure, and falling into the English channel between Havre and Honfleur. The direct distance from its source to its mouth is 270 m., but its windings make it nearly 500 m. long. It is navigable for large vessels to Rouen, and for small vessels 350 m. to Méry-sur-Seine. It is connected by canals with the Loire, the Saône and Rhône,

the Somme and Scheldt, and the Ourcq. Its elevation at its source is 1,426 feet above the level of the sea. At Paris its width is from 300 to 500 feet, and at its embouchure about 7 m. Its chief tributaries on the right are the Aube, Marne, and Oise, and on the left the Yonne, Loing, Essonne, Eure, and Rille; and it flows through one of the richest, most populous, and beautiful regions of Europe. The principal cities and towns that it passes are Châtillon, Bar-sur-Seine, Troyes, Nogent-sur-Seine, Melun, Paris, Mantes, Rouen, and Havre.

SEINE, the metropolitan department of France, in the old province of Ile-de-France, entirely enclosed by the department of Seine-et-Oise; area, 183 sq. m.; pop. in 1856, 1,727,419. It is divided into the arrondissements of Paris, St. Denis, and Sceaux, the first of which is conterminous with the city of Paris. The surface is generally level, but there are some heights, the principal of which are Montmartre and Chaumont to the N. of Paris, respectively 270 and 300 feet above the valley of the Seine. The Seine flows through the department from S. E. to N. W. by a very circuitous course; and the Marne joins it from the eastward. The most valuable mineral productions are building stone of an excellent quality and gypsum. The soil is throughout fertile, and cultivated with great care. Near the capital, fruits, vegetables, and flowers are the principal crops raised; the peaches of Montreuil, and the roses and strawberries of Fontenay, are particularly famous. Wine is made, but the quality is not very good. There are extensive tracts of meadows, and large numbers of cows and sheep are reared.

SEINE-ET-MARNE, a N. E. department of France, in the old province of Ile-de-France, bounded by the departments of Oise, Aisne, Marne, Aube, Yonne, Loiret, and Seine-et-Oise; area, 2,273 sq. m.; pop. in 1856, 341,382. The surface is undulating, and has many extensive plains. The Seine and the Marne flow through the department, and there are numerous other streams. It contains sandstone, fine millstones, building stone, and potters' clay. The soil is rich and well cultivated. The wine, though abundant, is of inferior quality. Capital, Melun.

SEINE-ET-OISE, a N. E. department of France, in the old province of Ile-de-France, bounded by the departments of Oise, Seine-et-Marne, Loiret, Eure-et-Loir, and Eure, and enclosing the department of Seine; area, 2,164 sq. m.; pop. in 1856, 484,179. The surface is diversified, but there are no high hills. The department belongs to the basin of the Seine, which flows through it in a circuitous course. There are several other streams, the chief of which is the Oise, which joins the Seine from the N. E. Millstones, sandstone, paving stone, plaster, chalk, and potters' clay are found; and there are sulphur springs in several places. The soil is not naturally very fertile, but it is carefully cultivated, and thus

rendered productive. The manufactures include different kinds of cloth, hosiery, paper, fire-arms, and Sèvres porcelain, the last, which is conducted by the government, being the most important. Capital, Versailles.

SEINE-INFÉRIEURE, a N. W. department of France, in the old province of Normandy, bounded N. and N. W. by the British channel, and S. W. by the lower Seine; area, 2,332 sq. m.; pop. in 1856, 769,450. It has a generally low surface, the coast being skirted by chalk cliffs of no considerable elevation except near Fécamp, where they are about 700 feet high, and it is traversed from E. to W. by a low offshoot of the Ardennes. The principal streams are the Bresle, Yères, and Arques, all of which flow into the channel. The manufactures comprise cotton, linen, cloth, lace, silks, and watch and clock movements, beside extensive machine works and ship yards. It has important fisheries. Capital, Rouen; other chief towns, Havre, Dieppe, Fécamp, and Harfleur.

SEISIN. See LIVERY OF SEISIN.

SEJANUS, LUCIUS ÆLIUS, a Roman conspirator, born at Vulsinii in Etruria, died A. D. 31. He was first attached to the interests of Caius Cæsar, the adopted grandson of Augustus, and future emperor Caligula, but gained the favor of Tiberius, who shortly after his accession appointed him to the command of the prætorian guards in conjunction with his father, Seius Strabo, who had held the post under Augustus. While in this position, in A. D. 14, Sejanus accompanied the younger Drusus, the son of Tiberius, into Pannonia to quell the insurrection of the legions. After his return to Rome his father was intrusted with the government of Egypt, and upon his departure the sole command of the prætorian cohorts devolved upon Sejanus. As his popularity with the guard increased he aspired to the imperial power. The first obstacle was Drusus, and to remove him Sejanus seduced his wife Livia or Livilla, whom he persuaded to poison her husband, promising to marry her afterward. He induced Tiberius to leave Rome and shut himself up to a life of sensual pleasure in the island of Capræa. He now procured the banishment of Nero and Drusus, the sons of Germanicus, and of their mother Agrippina. His wife Apicata had been divorced soon after the death of Drusus, and he had asked the emperor's consent to his marriage with Livia. This was refused, and he was about to hasten the development of his plan when Tiberius, informed by his sister-in-law Antonia of Sejanus's intention, gave the command of the prætorian guard to Nervius Sertorius Macro, and despatched him with a communication to the senate. Sejanus was induced to attend to hear this letter read, and was thereupon arrested by Sertorius, and was strangled the same day. His body was torn to pieces by the populace, and the fragments thrown into the Tiber. His son and daughter and many of his friends were put to death at the same time.

SELACHIANS (Gr. *σελαχιος*, a cartilaginous fish), a name given from Aristotle to the present day to the families of cartilaginous fishes with fixed branchiæ, comprising the rays and sharks, also called plagiostomes. (See PLAGIOSTOMES.)

SELDEN, JOHN, an English lawyer and author, born in Salvington, Sussex, Dec. 16, 1584, died in London, Nov. 30, 1654. He was educated at the university of Oxford, and in 1604 entered himself a student at law in the Inner Temple. After being called to the bar he practised chiefly as a chamber counsel, and by dint of severe study of the history and antiquities of his native country, as well as of logic and moral philosophy, became known at home and abroad, according to Anthony Wood, as "the great dictator of learning of the English nation." That he possessed at the same time valuable social qualities is evident from the fact that he was a regular member of Ben Jonson's literary club, which in the early part of the 17th century used to meet at the Mermaid tavern. His earliest published works were: "England's Epinomis," *Jani Anglorum Facies Altera*, and "The Duel or Single Combat" (1610), law treatises; "Titles of Honor" (1614), a work still regarded as an authority upon the subject; *De Diis Syris* (1617); and "History of Tithes" (1618). Having in the last named work denied the divine right of the clergy to receive tithes, he was obliged to make a public acknowledgment of his regret at having promulgated his opinions, which however he was careful not to retract. In 1621 he underwent a brief imprisonment for advising the commons to insist upon certain privileges in dispute between themselves and the crown; and in 1625, being then a member of parliament, he took part against the royal favorite, the duke of Buckingham, whom in the succeeding parliament he aided in impeaching. For several years he was an active opponent of court measures, and in 1629 he was again committed to the tower on a charge of sedition, his imprisonment lasting until May, 1631, when he was released on bail. He had meanwhile produced a variety of learned works, including his *Marmora Arundeliana* (1628), an account of the Arundelian marbles brought to England about that time. In 1635 appeared his *Mare Clausum*, dedicated to the king, and published at his request, on the occasion of a dispute with the Dutch on a question of fisheries. From this period he became less prominent in his opposition to the crown, and in the long parliament, to which he was elected in 1640 for the university of Oxford, he was found frequently siding with the king. He opposed the exclusion of the bishops from the house of peers, and also the condemnation of Strafford, although he was one of the members named to prepare the articles of accusation against him. Subsequently he held the office of keeper of the records in the tower, and having subscribed the "Solemn League and Covenant," he was ap-



pointed in 1644 one of the 12 commoners chosen commissioners to the admiralty. When it became apparent that the struggle between the crown and the commons could have no peaceful issue, he gradually withdrew from active political life, and while retaining the respect of both parties gave the weight of his influence to neither. His last sickness and death were at the house of the countess of Kent, to whom he is said to have been married. His remaining works include a variety of treatises in Latin on law and ecclesiastical antiquities, particularly those of the Jewish nation; but he is best known at the present day by his "Table Talk," a record of his opinions on many subjects, published in 1689 by Richard Milward, who for 20 years acted as his amanuensis. A complete edition of his works, with a memoir by David Wilkins, appeared in 1726 (6 vols. fol.). Olarendon bears testimony to his learning, humanity, and affability, and, while alluding to the harshness of his style, asserts that "in his conversation he was the most clear discourser, and had the best faculty of making hard things easy, and presenting them to the understanding, of any man that hath been known."

SELENITE, transparent crystallized sulphate of lime. See GYPSUM.

SELENIUM, an elementary substance discovered by Berzelius in 1818, and named from the Gr. *σεληνη*, the moon, on account of its resemblance to tellurium (Lat. *tellus*, the earth); symbol Se, chemical equivalent 40. It occurs sparingly in combination with iron, copper, silver, lead, cobalt, and mercury, and has in its properties and affinities a remarkable analogy with sulphur, replacing it to some extent in metallic combinations. Berzelius discovered it in a sulphurous sublimation formed in the process of making sulphuric acid near Fahlun, and traced it to the pyrites employed in this process. Obtained in powder, it softens below 212°, and melts a few degrees above this temperature. It forms on cooling a brittle solid with glassy fracture, metallic lustre, and deep brown color, of specific gravity from 4.8 to 4.8. It has neither taste nor smell, is insoluble in water, and a non-conductor of heat and electricity. At a high temperature it ignites and burns with a blue flame, and a portion volatilizing forms red fumes, which have an odor resembling that of sulphuret of carbon. It forms two combinations with oxygen, which correspond respectively with sulphurous and sulphuric acids. Its combination with hydrogen is a more noisome gas than sulphuretted hydrogen. Berzelius was deprived for several hours of the sense of smell by a bubble of it no larger than a pea.

SELEUCIA, the name of numerous ancient cities of Asia, situated in Assyria, Margiana, Syria, Mesopotamia, Cilicia, Pamphylia, Pisidia, Caria, and other countries, of which the following are the most important. I. SELEUCIA ON THE TIGRIS was founded by Seleucus I. of Syria, on the left bank of that river, near

its junction with the royal canal of Babylonia, and opposite to the mouth of the Delas (now Diala) river, a little S. of the modern city of Bagdad. Commanding the plains of the Tigris and Euphrates, and the principal caravan roads of Assyria and Babylonia, on the confines of which it was situated, and peopled by settlers from various countries of western Asia, it rapidly rose in wealth and splendor, and eclipsing Babylon became the capital of that part of Asia, until it was in its turn eclipsed by Otesiphon, built by the Parthians on the opposite bank of the Tigris. The later wars of the Romans against that people proved destructive to Seleucia. A city of upward of half a million inhabitants in the 1st century, in the following it was burned by Trajan and Lucius Aurelius Verus, and captured by Septimius Severus, and in the expedition of Julian against the Persians, in the 4th century, was found deserted. II. SELEUCIA PIERIA, a strong fortress of northern Syria, also founded by Seleucus I., whose remains were preserved there in a mausoleum, was built at the foot of Mt. Pieria, on a rock overhanging the Mediterranean, a few miles N. of the mouth of the Orontes and W. of Antioch, with which it was simultaneously founded, and of which it formed the seaport. It surrendered to Ptolemy III. of Egypt, was recovered by Antiochus the Great, and in the latter period of the Syrian kingdom became independent. Under the Romans it rapidly decayed. Considerable ruins of its harbor, fortifications, and necropolis are still to be seen.

SELEUCUS I. ΝΙΚΑΤΟΡ, the founder of the Syrian monarchy, born about 358 B. C., assassinated at Lysimachia in 280. He was the son of Antiochus, one of the generals of Philip of Macedon, and accompanied Alexander in his Asiatic expedition. After the death of that monarch, he adhered to the fortunes of Perdiccas, but soon after headed his assassins at Pelusium. In 321, on the second division of the empire, he received the satrapy of Babylonia, joined Antigonus against Eumenes, and received from the former the government of Susiana. When Antigonus assumed superiority over him, Seleucus fled to Egypt, and formed a league with Ptolemy, Lysimachus, and Cassander against the common enemy. Seleucus with a small body of men regained possession of the government of Babylonia in 312, and ever afterward kept it; and from this year the Syrian monarchy (in chronology the era of the Seleucidæ) is reckoned to commence. In 306 he assumed the title of king, and in 302 joined the new league formed by Ptolemy, Cassander, and Lysimachus against Antigonus. The war was ended by the victory of the allies at Ipsus in 301, when Antigonus was killed, and Seleucus obtained the greatest part of his dominions in Asia Minor. His empire was now the largest of any of the successors of Alexander, extending from Bactria and Sogdiana to the Mediterranean coast, and from central Phrygia to the Paropamisus. He afterward allied himself

with Demetrius Poliorcetes, the son of Antigonus, whose daughter Stratonice he married; but Demetrius having made himself king of Macedonia, Seleucus joined the alliance against him in 288. He did not, however, take any very active part in the war, and Demetrius having surrendered to him in 286, he treated him in a friendly manner, resisting the entreaties of Lysimachus to put him to death. In the mean time jealousies which had been long existing between him and the king of Thrace led to an open rupture. Seleucus began the campaign by invading the dominions of his rival with a large army. Lysimachus met him in a decisive battle at Corupedion in 281, in which the former was routed and slain. Not content with this, he determined to add Macedonia to his dominions, and crossed the Hellespont with a large army, but was assassinated by Ptolemy Ceraunus. He was succeeded by his son Antiochus. He founded in almost every province of his empire Greek colonies, of which the most celebrated were Antioch on the Orontes, Beroea, Edessa, Pella, and numerous cities with the names of Seleucia, Antiochia, Laodicea, and Apamea.

**SELF-DEFENCE.** The law requires no man to submit passively to the infliction of violence upon his person. He may always defend himself. If he is assaulted with blows, he may return blows; and if need be he may kill an assailant who attempts, or, rationally considered, seems to attempt to take his life. The principle, in all cases, is that the counter violence must be only so much as is necessary for defence. The doctrine of the law respecting the right of self-defence is in many of our states laid down in express statutes. In New York, for example, a homicide is justified "when there shall be a reasonable ground to apprehend a design to commit a felony or to do some great personal injury, and there shall be imminent danger of such design being accomplished;" and it is for the jury to declare the justifiableness of the homicide under such a statute, from their conviction of the existence of the reasonable ground for the apprehensions which the statute contemplates, and not from the circumstance that the prisoner did in fact entertain those apprehensions. In Tennessee it has been held that if one, through the influence of alarm or even cowardice, kill another under the actual impression that great bodily injury is about to be inflicted on him, it is justifiable self-defence, and not manslaughter or murder. No doubt, in every case the jury ought to consider carefully the power of constitutional timidity, but that should not be suffered to excuse altogether the mere imagination of danger and the destruction of another's life which it inspires. —The old rule of the law that any who was guilty of a felony deserved death, probably founded the rule that it is justifiable to kill any one who is attempting to commit a felony, such for example as murder, mayhem, or rape. This rule is generally included in the law of

self-defence. A man may also justify any violence done in defence of his wife, child, or servant, and either of these persons may justify violence in behalf of husband, father, or master.

**SELJOOKS**, or **SELJUKS**, a Turkish tribe, originally inhabiting the plain N. of the Caspian sea. They received their name from Seljook, one of their chiefs, under whose guidance in the 10th century they settled in Bokhara, and embraced Mohammedanism. His grandson Toghrul Beg received the title of sultan, conquered successively Khorassan and other Persian provinces, and at length in 1056 made himself master of Bagdad, which he occupied nominally as the servant and guardian of the caliph, but really with sovereign power, under the title of *emir-al-omra* or "commander of the faithful." He died in 1063, and was succeeded by his nephew Alp Arslan, who bears a great name in oriental history, especially for his victories over the Greek emperor Romanus IV., whom he made a prisoner. He also drove the Fatimites for the time out of Egypt and Syria, and conquered Armenia and Georgia. Gibbon says: "The fairest part of Asia was subject to his laws; 1,200 princes or the sons of princes stood before his throne; and 200,000 soldiers marched under his banners." He died in 1072, and was succeeded by his son Malek Shah, who by personal merit and the extent of his empire was the greatest sovereign of his age. He made Ispahan his capital, and his dominions stretched from the frontiers of China to the neighborhood of Constantinople. The ill treatment of the Christian pilgrims to Jerusalem by his viceroy was the immediate cause of the crusades. On his death in 1092 the succession to the throne was disputed by his brother and his 4 sons, and a series of civil wars ensued, which ended in the partition of the Seljookian empire among 4 branches of the imperial family, of which the principal dynasty ruled in Persia, and the 3 younger dynasties at Kerman, Damascus, and Iconium. The last named, which outlasted the others, endured till 1308, when it was succeeded by the Ottomans, founded by Othman, a Seljook chief. During the greater part of the 18th century the Seljookian sultans were tributaries to the Mongol emperors, who deposed and put them to death at pleasure.

**SELKIRK**, ALEXANDER, a Scottish seaman, born at Largo, Fifeshire, about 1676, died on board H. B. M. ship Weymouth in 1728. He went from England in 1703 as sailing master of the privateer Cinque Ports, and in Sept. 1704, in consequence of a quarrel with his captain, was put ashore at his own request on the island of Juan Fernandez, which was then much frequented by vessels navigating the Pacific. He was sufficiently supplied with clothes, arms, ammunition, and other necessities, and remained on the island in solitude 4 years and 4 months, when he was taken off by Capt. Woodes Rogers of the privateer The Duke, Feb. 2, 1709, and carried to England, where he arrived Oct. 1, 1711. He returned to Largo, where he re-

sided for some time, but at length eloped with a girl, whom he married, and went with her to London. Subsequently he entered the navy, and held the post of lieutenant when he died. Capt. Rogers, in his narrative of his cruise (London, 1712), gave an account of Selkirk's residence on Juan Fernandez; and a book by John Howell, entitled "Life and Adventures of Alexander Selkirk," was published in Edinburgh in 1829. His story is supposed to have suggested Defoe's romance of "Robinson Crusoe." (See JUAN FERNANDEZ.)

**SELKIRKSHIRE**, an inland county of Scotland, bounded by the counties of Edinburgh, Roxburgh, Dumfries, and Peebles; area, 264 sq. m.; pop. in 1851, 9,809. The surface is generally hilly, the hills varying from a few hundred feet in height to 2,370. The principal rivers are the Tweed and its tributaries, the Yarrow and Ettrick; and there are several small lakes, that of St. Mary's being the finest sheet of water in the south of Scotland. Only about  $\frac{1}{3}$  of the surface is arable. There are some manufactures of woollen goods. Selkirkshire returns one member to parliament. Capital, Selkirk.

**SELMA**, a village of Dallas co., Ala., situated on the right bank of the Alabama river, about 300 m. above Mobile and 100 below Montgomery; pop. in 1861, 3,177. It is situated on an elevated plateau, which terminates abruptly in a steep bluff forming the bank of the river. Passengers ascend and descend from and to steamboats by means of long flights of steps, and merchandise is drawn up the bluff by machinery. It is the southern terminus of the Alabama and Tennessee rivers railroad, and the Alabama and Mississippi railroad connects it with Uniontown and Marion. It had in 1860 2 iron foundries, a carriage manufactory, 2 banks, 2 public halls, 3 daily newspapers, 6 churches (Baptist, Campbellite, Episcopal, Methodist, Presbyterian, and Cumberland Presbyterian), and a number of public and private schools. In 1859-'60 it exported nearly 100,000 bales of cotton.

**SELTZER** (properly **SELTERS**) **WATER**, the product of mineral springs at Lower Selters, in the duchy of Nassau, in Germany, 20 m. N. from Wiesbaden. It is but slightly saline, containing in a wine pint only 29 grains of solid salts. These are: chloride of sodium (common salt), 17 grains; carbonate of magnesia, 5; carbonate of soda, 4; carbonate of lime, 3. The water is highly effervescent, containing 17 cubic inches of carbonic acid gas to the pint, and this serves to disguise the saline taste and render the water an agreeable beverage.—Water impregnated with 5 to 10 times its bulk of carbonic acid gas is sold very generally in the United States as a refreshing drink in the summer, and is called artificial Seltzer water, carbonic acid water, mineral water, and soda water. The gas derived from the action of sulphuric acid upon pulverized limestone passes under its own pressure from the confined vessel called

the generator into an adjoining one called the reservoir or fountain, which usually holds about 18 gallons and is about  $\frac{3}{4}$  filled with water. When fully charged with gas it is disconnected from the generator, and is commonly placed in the cellar of the shops, and a tube from it passes up through the floor to a strong metallic vessel under the counter and surrounded with ice. From this another tube forms the connection with the discharge cock fixed to the counter. Though containing no soda nor other saline matter, the water is not only refreshing from its effervescing and its coolness, but the carbonic acid imparts to it diaphoretic, diuretic, and anti-emetic properties. It is a grateful drink in fevers, and is a convenient vehicle for the administration of salts of magnesia and other saline cathartics. By means of an apparatus specially constructed for the purpose, the water charged with the gas, and with any of the saline matters, may be introduced into bottles and tightly corked, and thus be transported to any place and kept for use.

**SEMELE**, in Greek mythology, daughter of Cadmus, and sister of Ino, Agave, Autonoe, and Polydorus. She was beloved by Jupiter, and Juno, jealous and indignant, succeeded in persuading her to ask him that he would appear to her in the same splendor that he did to Juno. Having sworn to grant her every request she would make, and warned her in vain to desist from this, he unwillingly consented, and appearing in her presence as the god of thunder, she was consumed by the lightning; but the child with whom she was pregnant was saved, and was called Dionysus (Bacchus).

**SEMINOLES**, a tribe of southern American Indians, by some stated to be a vagrant branch of the Creeks, the name signifying wild or reckless, and thus expressing their predominant characteristic. In 1705 they assisted the English to drive the Appalachees, then under the influence of the French and Spaniards, from their territory in Florida, and kept possession for themselves. In 1817 a party of Seminoles, in conjunction with the refugee negroes and Creeks then occupying the Spanish territory, began to ravage the Georgia settlements. Gen. Gaines, who commanded the nearest fort, demanded that they should be given up, which the Indians refused. A skirmish followed shortly after, and some Indians having been killed, the Seminoles seized a boat on its way to Appalachicola, and massacred over 40 men, women, and children. Gen. Jackson, having been ordered to punish the Indians, entered their country in the early part of 1818 with an army of Georgians and Tennesseans, and not only checked their depredations, but took several Spanish strongholds, which led to the acquisition of Florida by the United States. In 1823, after the cession of Florida, the United States as a preventive against further aggressions made a treaty with the Indians at Moultrie creek, by which they agreed to relinquish the portion they occupied and retire to the in-

terior of the peninsula, restricting themselves to 15 miles distance from the coast. In 1832, after several years of increasing trouble, another treaty, known as that of Payne's Landing, was made, by which they bound themselves to remove within 3 years from Florida to the country W. of the Mississippi allotted to the Creeks, in consideration of which the government agreed to give each of the tribe a blanket and frock, and to pay them after their arrival \$15,400. This treaty was very much against the wishes of the nation, and they energetically opposed it, killing two successive chiefs who gave it their support. Among and at the head of the resisters was Osceola (see OSCEOLA), who at a council called and addressed by Mr. Thompson, the U. S. agent, in private session of the Indians, eloquently and successfully harangued them against complying with his demands, and the council dissolved without making the least concession. A subsequent attempt of the agent, somewhat more encouraging, was frustrated by the chief, who in addition to his views of policy was actuated by the most deadly hatred against Thompson for a personal wrong. The Indians now commenced a predatory warfare, ravaging the settlements of the whites, and retreating to their inaccessible swamps as occasion required. This was continued for several years without any adequate attempt to subdue them. On Dec. 28, 1835, a detachment of 110 men under Major Dade was surprised by the Indians, and every one of them killed except a few privates. On the same day Osceola killed Mr. Thompson at Fort King. He then took command of the Indian forces, and encountered Gen. Clinch on the banks of the Withlacoochee, but was compelled to retire. Gen. Gaines now left New Orleans with about 1,000 troops for the scene of war. On Feb. 27, 1836, he reached the Withlacoochee, where he was opposed by the Indians, who on that and the following day endeavored to check his advance, but failing retired. After a few days' more skirmishing, the Indians having returned, Gen. Gaines relinquished the command to Gen. Clinch. This system of warfare was prolonged for some time with varying success. On Oct. 23, 1837, Gen. Jesup, who had succeeded Clinch, treacherously made Osceola and a party of Indians under a flag of truce prisoners. Col. Zachary Taylor, whose head-quarters were at Tampa bay, left Fort Gardner Dec. 19, with about 600 men, and after a most difficult march through swamps and dense hummocks came upon the Indians under Sam Jones (Abiaca) and Alligator near Lake Okechobee. Here a desperate conflict ensued, in which, though the troops suffered severely, the Indians were compelled to retreat. Battles and skirmishes were of constant occurrence and of varied results, the Indians retreating to their fastnesses after defeat, but emerging as soon as opportunity offered. In April, 1838, Taylor, brevetted brigadier-general for services at Okechobee,

superseded Jesup in the command of the army in Florida, which he held until 1840. His policy was to enforce practically the terms of the treaty, and as fast as prisoners were taken they were shipped to their new homes. These amounted with voluntary emigrations to 1,900 up to 1839. This, with their losses in the innumerable conflicts, which were prolonged for several years, at last so reduced them that in 1842, their number being estimated at 301, of whom only 129 were warriors, and these having taken refuge where it was almost impossible to reach them, hostilities were suspended after having lasted 7 years, at an expense to the government of about \$10,000,000, and a loss of 1,466 lives. A large proportion of the remainder were by various devices taken prisoners and sent west within the next few years, and those who were left soon became too weak to give further trouble. Though the Seminoles took the most prominent part during the war, they were aided and sustained by a number of other tribes, among which were the Creeks, Tallahasseees, Mickassaukies, Uchees, and Hitchities, who composed at the close of the war about two thirds of the whole number.

SEMIRAMIS, a queen of Assyria, who reigned about 2000 B. C., or according to others about 1250 B. C., and whose history, as it has been handed down, is a collection of fables. According to an account borrowed by Diodorus from Ctesias, Semiramis was the daughter of the fish goddess Derceto of Ascalon, became the wife of Onnes, one of the generals and friends of Ninus, king of Assyria, and accompanied her husband in the expedition against Bactra. The siege of that place had lasted for a long time, and without much prospect of success, when Semiramis planned a method of taking the city by carrying the citadel, and led the assault in person. Ninus, attracted by her beauty and courage, made her his wife, on account of which Onnes destroyed himself. By Ninus Semiramis had a son named Ninyas, and after the death of her husband succeeded to the throne. According to another account, she obtained from Ninus the right to govern Asia for 5 days, and during that time made use of her power to imprison and destroy him. In the traditions of the East her achievements far surpassed those of preceding and following sovereigns. She is said to have built numerous cities, and to have erected magnificent works all over her kingdom. In Nineveh she built a tomb for Ninus, 9 stadia high and 10 feet wide; she raised an obelisk 180 feet high in the chief road in her dominions, formed a lake to receive the overflow of the Euphrates, laid out a great park near Mount Bagistan, and built and adorned the city of Babylon. She also carried on numerous wars, subdued Egypt and a great part of Ethiopia, and made war on an Indian king named Stabrobates. At first successful, she was finally defeated and wounded, and according to some traditions fell in the battle, but according to

others escaped to her own country, and soon after her return was put to death by her son Ninyas. Another tradition asserts that, after reigning 42 years, she gave up her sovereignty to her son, and vanished from earth, flying to heaven in the form of a dove. Although her history is unquestionably all or nearly all fabulous, her existence cannot be denied. She is believed from the cuneiform inscriptions to have been the wife of Iva-lush, the "Phul" of the Scriptures, and was in all probability a Babylonian princess in whose right her husband acquired the dominion over that country.

**SEMITIC RACE AND LANGUAGES.** The name Semitic is applied to designate a family of closely related peoples, among whom the Hebrews and Arabs are the most prominent and historically important, occupying the country included between the Taurus mountains on the north, the mountains of Media and the Persian gulf on the east, and the Indian ocean, Red sea, and Mediterranean on the south and west. They are so called, as possessing a territory assigned in Genesis to the descendants of Shem, son of Noah, and as being in the greater part traced to him as their ancestor in the Bible genealogies. The family is also often styled the Syro-Arabian. Its determination is based primarily on the evidence of language, strongly supported, however, by resemblance of national character and institutions. It is divided geographically and linguistically into 3 principal branches: the northern, or Aramæan, includes in its domain Syria and Mesopotamia; the central, or Canaanitic, is chiefly represented by the Phœnician and the Hebrew; the southern, or Arabian, covers the peninsula of Arabia, including, beside the Arabic, the Himyaritic and its outlier in Africa, the Ethiopian or Geez. Whether the domain of the Semitic languages should be extended westward so as to take in the dialects of northern Africa, the Berber and others, is a mooted question, of which the discussion or settlement need not be attempted here; if possessing peculiarly intimate relations to the Semitic family, they are yet not of that family in the same manner and degree as the other languages named. The mutual connection of the Semitic idioms is very close; they are, as it were, dialects of a single tongue, the differences between them being hardly greater than between the subdivisions of a single branch of the Indo-European family—for instance, the Teutonic or Germanic. They are generally classed by linguistic writers with the Indo-European languages, as composing with them the inflective division of human speech; but we must beware of hastily drawing from this false conclusions as to the genetical relationship of the two families; for the classification implies a similarity of spirit in the result attained by the formative processes of language—viz.: inflection, or the interweaving of the radical and formative parts of each word, or of theme and affix, so that they form together, both phonetically and to the conception, a

whole, a unity; as distinguished from agglutination, which leaves the root or theme always unchanged, and allows the modifying syllables attached to it to retain their distinct individual form, and to be felt as appendages—and not a resemblance and historical connection of the formative processes themselves. Very striking and fundamental peculiarities of form characterize the Semitic tongues, and the historical transition to Indo-European inflection from Mongolian agglutination, or even from Chinese monosyllabism, is easier to make than from Semitic inflection.—The alphabets in which the Semitic dialects are written are all of kindred origin, and the Phœnician represents most closely the primitive form of which they are developments or expansions. Except the Ethiopian, they read from right to left, and have a syllabic character, writing the vowels either not at all or only in exceptional cases. A characteristic of their phonetical system is the number and frequency of deep guttural sounds, very difficult of imitation by our organs; further, a lingual series, parallel with the dental *t, d, s, z*, and pronounced with the upper surface instead of the tip of the tongue; the general style of utterance seems also more full and labored than in our more western languages. Of grammatical peculiarities, the first and most notable is the triliterality of the roots; with very few exceptions, every word is traceable to a root containing three consonants, which are generally persistent and unchangeable in all derivative forms, while the number and quality of the vowels with which they are uttered varies indefinitely, and a great part of the system of derivation of the languages consists in the different vocalization of the three radical consonants. Thus, in Arabic, from the root *q-t-l*, to kill, we have *qatala*, he killed; *qatalâ*, they two killed; *qatalû*, they killed; *qutîla*, &c., he was killed, &c.; *uqtul*, kill! *qâtîl*, killing; *qatal*, a killing; *qâtala*, he tried to kill; *qîtl*, trying to kill; *aqtala*, he caused to kill; *iqtdl*, causing to kill; *qatl*, murder; *qîtl*, enemy; *qutl*, murderous, &c. This form of the roots is a no less distinctive peculiarity of the Semitic idioms, separating them from all other known languages, than is the monosyllabism of the Chinese; and it is even more anomalous than the latter, and harder to account for by the general analogies of linguistic growth; it is one of the most puzzling problems presented to the consideration of historical philology. Efforts have been repeatedly made to retrace the processes of this Procrustean development, and reduce the Semitic roots to a simple monosyllabic form; but they have been only partially successful. Such a reduction is, of course, a necessary preliminary to any comparison of the roots of the Semitic with those of the Indo-European or other families, in order to show an ultimate historical connection between them. Each Semitic verb has a number of different conjugations, dependent on and expressing the degree or quality of the action, as more or less active, as

repeated, intensified, caused, attempted, reflected, suffered, and the like. As regards temporal and modal distinctions, it is far less rich and precise; it has but two tenses, formerly called preterite and future, but now more generally perfect and imperfect, which names more nearly express their distinctive character as denoting completed and incomplete action; each may, according to circumstances, be either past, present, or future. The imperfect has an imperative. In tense declension, three numbers are distinguished, singular, dual, and plural, and the persons, excepting the 1st, have both a masculine and a feminine form. The noun, both substantive and adjective, has but a very scanty declension; it possesses three numbers, but has hardly any distinction of cases; only the Arabic has separate forms for nominative, genitive, and accusative, or for nominative and accusative. All words are either masculine or feminine. The personal pronouns, beside their full forms, have briefer suffix forms, which are attached to the governing word, whether verb, noun, or particle. The syntax is of the plainest and baldest character; a compound sentence or period, with members duly subordinated and interwoven by varied connectives, is a thing unknown; the style admits only of a simple ranging one after another of coördinate clauses, tied together by the conjunction and. There is no such thing as the formation of compound words.—A general literal and physical character belongs to the Semitic tongues; they depict sensible external attributes and actions, and have in a vastly less degree than the Indo-European idioms developed out of these a language for the moral and intellectual world; their expressions for metaphysical relations do not lose the character of bold metaphors. Hence, while picturesque and vivid, and capable of great force and dignity in description and injunction, they are but ill suited to continued and close argumentation, abstract reasoning, and philosophical investigation. With this character of the languages agrees that of the literatures of the race, which are somewhat monotonous and in important respects defective. Science and philosophy are almost wanting in them; of imaginative fiction there is next to none; and poetry is didactic and lyric only, never rising into the spheres of the dramatic and the epic.—The historical importance of the Semitic race begins perhaps with the Aramæan branch, in the Mesopotamian empires of Nineveh and Babylon, although it is yet matter of question how far those were properly Semitic empires, and not rather of another race, founded among and over a population in great part Semitic. The study of the cuneiform inscriptions has not yet reached a point at which we can tell what results it will yield for the early history of the Semites. Nor has it been thought necessary to take any account above of the Semitic dialect alleged to be represented by the inscriptions of the second class, considering the still unfinished state of

their investigation, and the serious doubts felt by many noted scholars as to many of the conclusions arrived at; if Semitic, it has a peculiar character, and its relation to the other dialects remains to be determined. With this possible exception, the earliest branch of the family to acquire prominence in universal history was the Canaanitic. The Phœnicians, by a commercial and industrial activity unsurpassed in ancient times, vastly extended the knowledge of the earth's geography and valuable productions, sowed the seeds of civilization and learning on remote coasts, and bound different races together by the ties of mutual helpfulness. Their principal colony, Carthage, long bore sway over northern Africa, extensively spreading there its language and institutions; and it disputed for a time with the growing power of Rome the empire of the world. Neither Phœnicia nor Carthage has left a literature; the language of the former is known solely from medals and inscriptions, chiefly found on the sites of her various colonies. Only within a few years has been discovered in the mother country, at Sidon, a monument outweighing them all in extent and value, the inscription on the coffin of King Eshmunazer, now in the museum of the Louvre at Paris; it is about equal in extent to the 10th chapter of Genesis, or the 104th Psalm, and dates from the 5th or 6th century B. C.; its idiom is almost purely Hebrew. The Punic dialect, although it is supposed by some not to have become extinct in northern Africa until after the Mohammedan invasion, is known to us only by a mutilated passage in a Carthaginian play of Plautus, and by a few epigraphical monuments. Of the wonderful literature originated during the period of Phœnician commercial and colonial activity by the other tribe of the Canaanitic branch, the Hebrews—a race comparatively insignificant in political history—we do not need to speak; the Hebrew Bible has been made by Christianity a household book among all the races of civilized man. The extinction by Greece and Rome of the power and independence of Phœnicia, and the dispersion and exile of the Hebrews, only very imperfectly retrieved by the later restoration of a part of them, caused the decay of this whole branch of the family some centuries before the Christian era; even their languages were crowded out and replaced by Aramaic dialects; and for more than 1,000 years, till the rise of Mohammedanism, the Aramæan was the principal branch, and its languages almost the sole organs of Semitic thought. After the destruction of Jerusalem, Judaism took refuge in Babylonia and Arabia; Syria, converted to Christianity, was active in spreading it through central Asia, even to China, and an extensive Syriac literature grew up, founded however on Greek influence, and reflecting European Christianity, and so only partially Semitic in character. It is asserted of late that important remains of an ancient Nabathæan or Babylonian literature still exist

in Arabic translations; but its principal work, the "Book of Nabathæan Agriculture," long looked for with much interest by the learned, and of which the speedy publication is promised by Ohwolson, seems likely to turn out, at least in great part, a modern fabrication. The revival of Semitic power and influence by the Arabs, under the inspiration of Mohammedanism, in the 7th century, opened a new era in the history of the race, transferring its leadership to a branch hitherto insignificant, and giving it a combined political and literary importance which it had never before enjoyed. Gathering in to themselves the forces of all the Semitic tribes, and also of other conquered peoples of different lineage, the Arabs were for a time not only the most active proselytizers, but the most formidable military power, and the foremost representatives of art and science, throughout the world. This part of Semitic history, however, is sufficiently treated in the articles ARABIA and MOHAMMEDANISM. With the decline of Mohammedanism came the decadence of Semitism as a living power in history, although half the world still owns the sway of Semitic ideas and institutions, especially in matters concerning religion. Arab authority is again limited within the boundaries of the Arabian desert; but Arabic is still everywhere the sacred dialect of Mohammedanism; it is vernacular in Egypt and parts of N. Africa, and all the languages from the mouth of the Ganges on the east to the Atlantic shores of Africa and Spain on the west confess its influence by the greater or less infusion which they have received from its vocabulary. The Hebrew maintains only an artificial existence among the scanty Jewish communities scattered through the world, but its ancient literature is "the Book" *par excellence* of the leading civilized races. The domains of the Aramæan branch have been invaded and occupied by the Arabic, and of its languages there remain only the dialects of a few tribes near Damascus, and the modern Syriac of the Nestorian and Chaldean Christians in Koordistan and upon the borders of Persia. Abyssinia still employs the Geez and the kindred Amharic as literary dialects, and its spoken languages are in part descended from Semitic originals. The Maltese is a mixture of Arabic and Italian, the former predominating and constituting its groundwork.—To this brief sketch of the history of the race it is necessary to add but a word respecting its character, already illustrated in part upon the side of language and of history. Subjectivity, egotism, intense feeling and passion, unreasoning and intuitive penetration, are its distinctive traits. It lacks the richness and variety, and capacity of many-sided and indefinitely progressive cultivation, which belong to the Indo-European race. It has little power of organization; its civil and political life is simple; it has governed the world not so much by institutions as by ideas, and mainly by the idea of monotheism, the central feature of the Hebrew

religion, and the reassertion of which made the power also of Mohammedanism. It must be pronounced, upon the whole, inferior to the other principal white race, to which it has now everywhere yielded the leadership of mankind.

SEMLER, JOHANN SALOMO, a German theologian, and one of the chief founders of the rationalistic school (see GERMAN THEOLOGY), born in Saalfeld, Dec. 18, 1725, died March 14, 1791. In 1750 he was appointed professor at the gymnasium of Coburg and editor of the *Coburger Zeitung*, in 1751 professor of theology at the university of Halle, and in 1757 director of the theological seminary in the same city. He was a prolific writer in several departments of theology. In his exegetical writings he urged the difference between the canonicity and the inspiration of a biblical book, maintaining that the latter could not possibly be determined by its reception into a volume merely destined to be read in the churches, but only by intrinsic evidence of truth. He rejected therefore a number of the books of the Old Testament, and the Apocalypse in the New Testament, as not inspired. He was the first to develop the doctrine of "accommodation," according to which Jesus and his disciples accommodated themselves to the prevailing Jewish notions; and he taught that the national, local, and temporal peculiarities in their language must be well distinguished from the general truths, as which he recognized only those that have a direct and immediate bearing on the virtue and happiness of men. In his works on systematic theology he declared only those doctrines of Christianity essential which elucidate the nature of God and the essential relation of man to him, regarding all the rest, such as the doctrine of the Trinity, of the atonement of Christ, &c., as ever changing religious representations without obligatory character. The most important among his followers and pupils was Griesbach.

SEMLIN (Slav. *Zemun*; Hun. *Zimony*), a fortified town of the Austrian Military Frontier, at the junction of the Save with the Danube, 8 m. N. W. from Belgrade in Serbia, which is situated at the opposite nook formed by the junction of the two rivers; pop. about 10,000, consisting mostly of Slavonians, Serbs, Germans, and Jews. It is the principal entrepot of the trade between Austria and Turkey, has some manufactures, a theatre, several churches and schools, and a quarantine establishment. During the Hungarian and Austrian wars with the Turks its situation often made it a place of great strategic importance.

SEMNERING, or SÖMNERING, a branch of the Noric chain of Alps, between Austria proper and Styria, 4,416 feet high, furnishing the principal passage between Lower Austria and the more southern provinces of the Austrian empire. In the 14th century a duke of Styria founded a hospital for travellers on the Styrian side of the pass. A post and carriage road over the mountain was completed by the



emperor Charles VI. in 1728. It rises, partly by zigzags, to a height of 3,290 feet above the sea, and has on its summit level a stone monument with the inscription: *Aditus ad Mariæ Adriaticæ Litora*. A new highway, longer, but more practicable, was completed in 1840. A railway over the Semmering, projected and undertaken by a private company, was executed for the Austrian government by the engineer Carlo Ohenga between 1848 and 1854. It extends 25 m. from Gloggnitz, at the N. extremity of the pass, 1,378 feet above the sea, to Mürzzuschlag, at the S. extremity, 2,181 feet above the sea. It rises from Gloggnitz, passing several pretty villas, crossing the Schwarzer on a curved viaduct of 13 arches, and sweeping along the shoulders of the hills through a series of magnificent engineering works, till it attains a height of 2,893 feet above the sea, when any further ascent is avoided by a tunnel through the mountain, 4,600 feet long. The works on the southern slope are less remarkable. Altogether the railway has about 2 m. of tunneling. Quick trains run from Gloggnitz to Mürzzuschlag in 1 hour and 50 minutes.

SEMPLE, ROBERT BAYLOR, an American clergyman, born at Rose Mount, King and Queen co., Va., Jan. 20, 1769, died at Fredericksburg, Va., Dec. 25, 1831. At the age of about 18 he commenced the study of law, which he abandoned for theology, and in 1790 became pastor of the Bruington Baptist church. He divided his time between preaching, teaching, and the management of a farm or plantation; and he took a leading part in the educational and missionary operations of his denomination, and also in the colonization society. In 1827 he became the financial agent of the Columbian college, retaining his pastorate. From 1820 he had been the president of the Baptist triennial convention. As early as 1805 he was offered the presidency of Transylvania university, but declined it. The degree of D.D. was conferred on him by Brown university and William and Mary college, but from conscientious scruples he declined the honor in both cases. He published a catechism for children, which passed through numerous editions; a "History of Virginia Baptists," with several biographical notices appended (1810); a "Memoir of Elder Straughan;" "Letters to Alexander Campbell;" and some minor works.

SÉNAC, JEAN BAPTISTE, a French physician, born near Lombez, Gascony, in 1693, died in Paris, Dec. 20, 1770. In 1752 he was appointed first physician to Louis XV., by whom he was subsequently made a councillor of state and superintendent general of the mineral waters of the kingdom. His principal work is a *Traité de la structure du cœur* (2 vols. 4to., 1749).

SENATE (Lat. *senatus*, an assembly of elders), the deliberative assembly of the Roman people. It was composed originally of 100 members, each representing one of the *decuries* into which the *populus Romanus*, or body of the Roman citizens, when it comprehended but a

single tribe, the Ramnenses, was divided. When the Sabines or Titienses were incorporated with the Ramnenses as a second tribe, an equal number of senators was added; and upon the admission of the third tribe, the Lucerenses, in the reign of Tarquinius Priscus (according to the opinion of recent critics), the number was increased to 300. The new senators were however distinguished from those of the two earlier tribes (who were called *patres majorum gentium*) by the title of *patres minorum gentium*. The number was diminished considerably during the reign of Tarquin the Proud, but at the formation of the republic was recruited to the established standard from the principal plebeians of the equestrian order, who were thence called *conscripti*, and it was thereafter customary to address the whole senate as *patres conscripti*, that is, *patres et conscripti*. The number remained unchanged, notwithstanding attempts at alteration by Caius Gracchus and the tribune Livius Drusus, until the time of Sylla, when it was increased to 600 by the addition of 300 *equites*. Julius Cæsar created several hundred new senators, and during the second triumvirate the number exceeded 1,000. Augustus reduced it to 600. The senators held office for life, and were originally men of advanced age; but under Augustus they were admitted as members in their 25th year, which thenceforth became the *ætas senatoria*. They were elected during the kingly period by the *decuria*, under the republic by the consuls and consular tribunes, and after the establishment of the censorship by the censors exclusively. The persons eligible to fill vacancies were those who had been quaestors or curule magistrates, and the latter held seats *ex officio*, and were entitled to speak but not to vote. The plebeians as an order were never eligible, but after the quaestorship and curule magistracies were opened to them, they of course frequently attained to the senatorial dignity. Hence the senate, originally a purely aristocratic body, became gradually the real representative of the people. No property qualification seems to have been required previous to the time of Augustus, who established a senatorial census, which was increased from 400,000 sesterces to 1,200,000; and any senator falling short of this amount was obliged to withdraw from office. Senators were forbidden to engage in mercantile pursuits, and no one was eligible to office whose parents were not of free birth; but from both these requirements there appear to have been frequent deviations. The senate met on the kalends, nones, and ides of each month during the republic, and under Augustus on the kalends and ides only; but extraordinary meetings could be convoked on any day not a *dies comitialis* or a *dies ater*, by a variety of magistrates, who on such occasions exercised the privilege of presiding. At regular meetings under the empire one of the consuls, or the emperor if a consul, generally presided; and the number of senators constituting

a quorum seems to have varied from about 70 to 400. The title of *princeps senatus*, which was originally associated with that of *custos urbis*, and conferred the power of convoking and presiding over the senate, became after the overthrow of the republic a purely honorary one, and was usually borne by the emperors. After the time of Julius Cæsar the proceedings were regularly recorded by scribes appointed for the purpose. The powers of the senate during the republic comprehended the general care of the public welfare, the superintendence of all matters of religion, the management of all affairs with foreign nations, and the disposition of the finances requisite for these purposes. Its enactments, called *senatus consulta*, and which were passed by a majority of votes, under Augustus and his successors took the place of the *leges* enacted by the *comitia tributa*. Its authority was considerably impaired after the institution of the tribunes of the people, and in the latter part of the republic it frequently became merely an instrument in the hands of Sylla, Cæsar, and other ambitious generals. The establishment of the empire reduced it to the condition of a purely subordinate power, whose functions and very existence were dependent on the will of the emperor. As a high court of justice, however, it still possessed a considerable degree of importance, and admission into its ranks, which was wholly under the control of the emperors, in virtue of their assumption of the censorship, was coveted by men of wealth and rank down to a late period. A second senate was established by Constantine at Byzantium, upon which Julian conferred powers similar to those possessed by the Roman senate. The latter body continued in existence until the Gothic conquest of Italy in the 6th century, and seems to have been the last depository of what remained of the old national spirit.—The affairs of the Italian cities and provincial towns of the Roman empire were administered by bodies called senates, whose functions were generally of a civic character; and the term is frequently employed in modern times to designate the upper house of assembly in republican or limited monarchical governments. The senate of the United States is composed of two members for each state of the Union, who are elected by the legislatures of such states and hold office for the term of 6 years. In addition to its legislative functions, it possesses the power of ratifying foreign treaties and nominations to office made by the president, and is the high court of impeachment for public functionaries. Each state of the Union has a legislative chamber, which exercises functions of a similar nature, though differing in degree.—The French senate, called the *senat conservateur*, came into existence after the revolution of the 18th Brumaire, and was originally composed of 80 members of at least 40 years of age. Its chief functions were to prevent violations of the constitution, to introduce such changes as were neces-

sary into that instrument, and to elect the consuls, tribunes, and members of the legislature from lists prepared by the departments. It soon became a tool in the hands of the first consul, and upon the establishment of the empire was reduced to the condition of a state council. It was replaced by the chamber of peers at the restoration of the Bourbons, but was revived by Napoleon III. in 1852.—The Hanseatic towns are governed by senates, and similar bodies, having legislative functions of various degrees of importance, are recognized by the constitutions of Belgium, Greece, and some other European governments. The Russian senate is the supreme judicial tribunal of the empire, and its decrees, when not vetoed by the emperor, have the force of laws. In many countries of Europe, particularly in Germany, the affairs of universities are administered by academic senates, composed of the professors, and over which the government exercises a control by means of a royal commission. The term is there commonly applied to the managing board of a scientific or literary association.

SENECA. I. A central co. of N. Y., bounded E. by Cayuga lake and Seneca river, and W. chiefly by Seneca lake, and drained by the Seneca and Clyde rivers; area, 330 sq. m.; pop. in 1860, 28,139. The surface is hilly and the soil generally very fertile. The productions in 1855 were 163,108 bushels of wheat, 556,288 of oats, 387,998 of Indian corn, 104,856 of barley, 72,544 of potatoes, 175,278 of apples, 705,574 lbs. of butter, 529,811 of flax, 150,946 of wool, and 20,879 tons of hay. There were 4 newspaper offices, 48 churches, 98 schools, 5 furnaces, 15 grist mills, and 15 saw mills. The New York central railroad, the Erie canal, and the Cayuga and Seneca canal traverse the county. Shire towns, Ovid and Waterloo. II. A N. co. of Ohio, intersected by Sandusky river and Honey and Green creeks; area, 540 sq. m.; pop. in 1860, 30,869. The surface is almost level, well timbered, and very productive. The productions in 1850 were 474,737 bushels of wheat, 632,879 of Indian corn, 237,112 of oats, 202,181 lbs. of wool, and 25,580 tons of hay. There were 31 saw mills, 11 grist mills, 3 woolen factories, 6 tanneries, 3 newspaper offices, 49 churches, and 6,451 pupils attending public schools. Large numbers of cattle and swine are raised. It is traversed by the Sandusky, Dayton, and Cincinnati railroad. Capital, Tiffin.

SENECA, MARCUS ANNÆUS, a Roman rhetorician, born in Corduba (Cordova), Spain, about 61 B. C., died in Italy probably near the end of the reign of Tiberius. He appears to have spent part of his early life in Rome, but afterward returned to Spain, and there married. He was a rich member of the equestrian order, was gifted with a great memory, and wrote several books, of which only fragments remain. One of these, entitled *Controversiarum Libri X.*, consists of rhetorical remarks on supposed

cases. Another treatise, called *Suasorium Liber*, is ascribed to him. The matter of both works is worthless.—LUCIUS ANNEUS, a Roman stoic philosopher, son of the preceding, born in Corduba a few years before the Christian era, died in Rome, A. D. 65. He was early brought to Rome, applied himself to the study of rhetoric and philosophy, travelled in Greece and Egypt, and became a successful advocate, and subsequently quæstor. Messalina, the wife of the emperor Claudius, having accused him of adultery with Julia the emperor's niece, he was banished to Corsica for 8 years, during which he wrote one of his best treatises, the *Consolatio ad Helviam*, a consolatory letter to his mother, and the *Consolatio ad Polybium*, addressed to a powerful freedman of Claudius. In the latter, the authenticity of which has been doubted, he grossly flatters the emperor. In 49, through the influence of Agrippina, who after the death of Messalina had married her uncle Claudius, Seneca was recalled, and was made prætor. Subsequently, with Afranius Burrhus, he became tutor to the young Domitian, afterward the emperor Nero. After Claudius had been poisoned by his wife, Nero ascended the throne, and both Burrhus and Seneca hereupon placed themselves in opposition to the pretensions of Agrippina. A reconciliation was however effected, but the reputation of Seneca has been somewhat injured by the attack made upon him in A. D. 58 by Suilius, one of Claudius's instruments, who charged him with debauching Julia, accumulating a fortune of 300,000,000 sesterces by unjust means, and despoiling Italy and the provinces. Not long afterward Nero put his mother to death in consequence of her opposition to Poppea; and if Seneca had no hand in instigating the deed, he certainly consented to it. Nero, tormented by his conscience, fled to Naples, and from that place sent to the senate a letter written by Seneca, in which he charged Agrippina with a conspiracy against himself, and with having committed suicide in consequence of its failure. In 63 Burrhus died, and Seneca, conscious that the emperor was growing tired of him and coveted his wealth, offered to surrender his property, and retire on a small competency. This the emperor refused, and from this period, says Tacitus, Seneca "kept no more levees, declined the usual civilities which had been paid to him, and under pretence of indisposition avoided appearing in public." At this time Nero is reported to have made an effort to poison him. Not long afterward he was accused of complicity in the conspiracy of Piso, and ordered to commit suicide. Without showing any signs of alarm, Seneca had the veins of his arms opened; but on account of his age and the extreme meagreness of his body, the blood flowed slowly, and the veins in his legs were also opened. As even this did not much relieve his pain, a dose of hemlock was given without producing any effect. He was at last placed in a warm bath and then taken into a

vapor stove, where he was soon suffocated. His wife, Paulina, caused her own veins to be opened, but by order of Nero they were tied up by her attendants, and she lived a few years longer.—Beside the two treatises already mentioned, Seneca wrote *De Ira*; *De Consolatione ad Marciam*, written to console the daughter of A. Crematius Cordus for the loss of her son; *De Providentia*, a discussion of the question why evils happen to good men; *De Animi Tranquillitate*; *De Constantia Sapientis*; *De Clementia ad Neronem Cæsarem*; *De Brevitate Vitæ ad Paulinum*, a treatise on the employment of time and the acquisition of wisdom as the chief object of life; *De Vita Beata ad Gallionem*, to which is sometimes added *De Otio aut Secessu Sapientis*; *De Beneficiis*; 124 *Epistolæ ad Lucilium*, containing moral maxims and observations; *Apocolocyntosis*, a satire on the emperor Claudius; and *Questionum Naturalium Libri VII.*, a work which treats of physical phenomena. There were several other works by Seneca now lost. "He treated," says Quintilian, "on almost every subject of study; for both orations of his, and poems, and epistles, and dialogues are extant." Ten tragedies are attributed to him, although their authenticity has sometimes been denied: *Hercules Furens*, *Thyestes*, *Thebais* or *Phœnissæ*, *Hippolytus* or *Phædra*, *Œdipus*, *Troades* or *Hecuba*, *Medea*, *Agamemnon*, *Hercules Œtæus*, and *Octavia*. Their merit has been even far more discussed than their authorship; they were designed not for representation upon the stage, but for reading. The character and the works of Seneca have alike been made the subject of much controversy among critics, some praising him extravagantly, and others censuring him in the same proportion. He was no believer in the superstitions of his country, and has been called by some an atheist; but his religion appears to have been pure deism. On the other hand, it has been asserted that he was a Christian, and was acquainted with St. Paul; and 14 spurious letters purporting to be written by him to that apostle were printed in the old editions of his works. The *editio princeps* of Seneca is that of Naples (fol., 1475). Since that time there have been numerous editions, of which that of Schröder (4to., Delft, 1728), the Bipont edition (Strasbourg 1809), and that of F. H. Bothe (2 vols. 8vo., Leipsic, 1819) are valuable. There have been several translations into English.

SENECA INDIANS, a once powerful tribe belonging to the Iroquois or Six Nations, and formerly occupying W. New York and a portion of N. W. Pennsylvania. Their most famous chief was Sagoyewatha or Red Jacket. They now occupy, with other New York Indians, a large reservation in Kansas.

SENECA LAKE, a long, narrow sheet of water, lying nearly N. and S. in the W. part of New York, between Seneca co. on the N. and E., Schuyler co. on the E., S., and W., and Yates and Ontario cos. on the W. It is about 37 m.

long by 2 to 4 m. broad, has an elevation of 441 feet above the Atlantic, and about 210 feet above Lake Ontario, and is surrounded by beautiful scenery. It flows into Lake Ontario through the Seneca and Oswego rivers, and is connected by canals with the Erie canal, with Crooked lake near its W. border, and with the Chemung river. It is 630 feet deep, and was never known to be frozen over till March 22, 1856. It is navigated by steamboats running from Watkins at the S. to Geneva at the N. extremity.

SENECA OIL. See PETROLEUM, vol. xiii. p. 207.

SENEFELDER, ALOYS, the inventor of lithography, born in Prague in 1771, died in Munich, Feb. 26, 1834. The son of an actor, with whom he came to Munich when a child, he was sent at an early age to Ingolstadt to study law; but on the death of his father poverty compelled him to leave the university, and he tried unsuccessfully to be an actor and dramatist. Having learned something of printing, but not having the means to purchase materials to print his works, he conceived the idea of inventing a process of his own. He made a variety of experiments, and was finally led by accident to his great discovery. (See LITHOGRAPHY.) His first prints, some pieces of music, were highly praised by the elector, to whom they were exhibited. Subsequently he made important improvements, contrived a press, procured a patent, and set up an establishment, which he carried on for some time successfully. In 1809 he was appointed inspector of the royal lithographing establishment. In 1819 he published the "Elements of Lithography," a curiously illustrated work, which was translated into English and French.

SENEGAL, a river of W. Africa, the principal branch of which rises in lat.  $10^{\circ} 51' N.$ , long.  $8^{\circ} 20' W.$  It flows first nearly N. W., and afterward describing a long curve acquires a S. W. direction, falling into the Atlantic by two mouths, which lie respectively in lat.  $15^{\circ} 50'$  and  $16^{\circ} 30' N.$  It is about 700 m. long. The principal mouth, which retains the name of Senegal, is obstructed by a shifting and dangerous bar. It is the largest river in Senegambia, about half of which belongs to its basin; but the lower part of its course is much reduced by numerous drains which carry off its waters. The head branches of the Senegal are the Bakhoy or White river and the Baking or Black river, the latter of which is considered the chief source. They unite at Bafoulabe, a little below lat.  $14^{\circ}$ . About 15 m. below the junction there is a fall of 80 feet, and 100 m. still lower the Faleme joins the Senegal from the S. From Joag, about lat.  $14^{\circ} 30' N.$ , the Senegal flows through a plain which extends to its mouths. It has an exceedingly tortuous course. Owing to numerous shoals, the Senegal can only be ascended by small boats during the dry season; and after the rains, when the river in the upper part of its course sometimes reaches the height of 40 feet

above its summer level, the navigation is exceedingly tedious. In the month of August it attains its highest level, and about the beginning of December it has fallen within its bed. Along the lower part of its course the inundations are more extensive than toward the source, where the banks are high.

SENEGAL, a French colony on the W. coast of Africa, consisting of several forts along the whole course of the Senegal and Faleme rivers, the island and town of St. Louis at the mouth of the Senegal, and Allreda at the mouth of the Gambia; pop. in 1858, 35,000. The French have been gradually extending their power in this region for several years past, and subduing the surrounding tribes. The trade is chiefly in gold, ivory, wax, gums, ground nuts, oleaginous grains, millet, cattle, cotton, and indigo, and the aggregate annual value of imports and exports is from \$2,000,000 to \$3,500,000, the commerce being almost exclusively in the hands of the French. The establishment is under a colonial governor, and has 5 companies of native sharpshooters, a marine battery, a detachment of sappers, and a squadron of French and native spahis, beside a body of militia and 12 vessels of war.

SENEGAMBIA, a region of West Africa, bounded N. by the Sahara, E. by Soodan, S. by Sierra Leone and Liberia, and W. by the Atlantic, extending from lat.  $8^{\circ}$  to  $17^{\circ} N.$ , and from long.  $6^{\circ}$  to  $17^{\circ} 30' W.$ ; area, about 880,000 sq. m.; pop. estimated at 9,000,000. The French have establishments on the river Senegal, the English on the Gambia, and the Portuguese on the Rio Grande. These European settlements in Senegambia are entirely of a commercial nature, and the whites have acquired no property in the land. The chief native territories are the kingdoms of Kayor, Baol, Sin, Barra, Salum, Yanimaroo, Katoba, Wooli, Walo, Burba, Jaloof, Footatoro, Bondoo, Kajaaga, Bambook, Fooladoo, Konkodoo, Satadoo, Dentilla, Neola, Tenda, Foota Jallon, and the uninhabited wilderness of Jallon and Kadoo, which lie about the sources of several branches of the Senegal. The N. part of the coast is sandy, low, and barren, with here and there a few rocky cliffs; but toward the S. the appearance changes, and there is much luxuriant vegetation.—The principal rivers are the Senegal, Gambia, Rio Grande, and Casamanza. The E. part of the country is mountainous, and in the N. E. the mountains probably attain the height of 6,000 feet above the sea. A belt of level land from 150 to 200 m. wide extends inland from the coast. The geological structure of E. Senegambia is very imperfectly known, but granite has been found in the N., and volcanic rocks frequently cover the granite toward the S. Iron ore is abundant in the elevated districts, and gold is found in large grains lower down. The climate is very warm, but with the exception of the N. tract bordering the Sahara, on the banks of the Senegal, it does not appear to be hotter than other regions situated in the

same degree of latitude. Much of the land is exceedingly fertile. In the forests are found many valuable kinds of timber, gums, and caoutchouc; cardamoms and cassia are also obtained, and indigo grows wild. Rice, maize, and millet are the chief grains cultivated. Hemp is extensively grown. All the domestic animals of Europe are found, in addition to which there are camels in the desert country of the Jaloofs. Elephants are very numerous, and the hippopotamus is found in all the rivers. Buffalo, deer, antelopes, wild boars, hares, porcupines, lions, panthers, and hyenas are all natives of the country. Alligators are numerous, and the boa frequents the marshy grounds.—The inhabitants consist of the aboriginal negro tribes, Moors, and the offspring of these two. The mixed race are of middle size, of a light copper color, well made, and active. Many of the women are remarkably handsome, and both sexes dress neatly. They are much more civilized than the black tribes, who are generally lazy, treacherous, and cruel. The latter cultivate some land, rear pigs, fowl, and a few cattle, and wear only a piece of cloth round their loins. Slavery does not exist among them, but they sell their prisoners of war to the traders. The mixed races live under regular governments, generally consisting of a king and hereditary nobility; and they keep large numbers of slaves.—Beside the trade carried on by the French, English, and Portuguese from their settlements upon the 8 great rivers, a considerable traffic exists between Senegambia and the countries lying further E. Much of the gold found in the elevated districts is carried to Timbuctoo, and thence finds its way to the countries N. of the great Sahara.—The term Senegambia was originally applied to a territory lying between the Senegal and Gambia, but has latterly been extended to the whole of the country between the former river and the British colony of Sierra Leone. The Carthaginians visited this part of the coast of Africa, and the Portuguese reached it between 1444 and 1469. The latter nation formed several commercial establishments, but afterward neglected them when they discovered the route to India. The French settled on the Senegal about 1675, and the English on the Gambia about 10 years afterward. Both these nations have contributed toward exploring the interior of the country, and the French particularly are now engaged in extensive explorations.

SENESCHAL (low Lat. *senescallus*), an officer of high rank and power in France during the middle ages, who originally acted as lieutenant or steward of the great feudatories of the kingdom, and who after the growth of the royal power discharged similar functions in behalf of the king. The royal seneschal was called the *grand sénéchal*, in contradistinction to the seneschals of the feudal princes. The term is sometimes applied to the principal officer of a baronial establishment or castle, who is in reality only the steward.

SENIOR, NASSAU WILLIAM, an English political economist, born at Uffington, Berkshire, Sept. 26, 1790. He studied law under Mr. Sugden (afterward Lord St. Leonards), was called to the bar in 1817, and in 1826 was appointed professor of political economy in the university of Oxford, which position, after having left it for some time, he resumed in 1847. In 1853 he resigned the office of master in chancery, which he had held since 1836. He has paid particular attention to pauperism and the poor laws, and has been a member of several government commissions on that as well as other subjects. His chief works are: "Introductory Lectures on Political Economy" (8vo., 1826); "On Foreign Poor Laws and Laborers" (8vo., 1840); and "Treatise on Political Economy" (8vo., 1850), originally published in the "Encyclopædia Metropolitana." His latest work is "A Journal kept in Turkey and Greece in 1857 and 1858." (See POLITICAL ECONOMY, vol. xiii. p. 453.)

SENNA (Arab. *suna*), the dried leaves of several species of the genus *cassia*, used in medicine as a purgative, and thus employed by the Arabians as far back as the 9th century. The plants are shrubs of the natural order *leguminosa*, and are found growing wild in Egypt, Syria, Arabia, &c. One species, the *Marylandica*, or wild senna, is common in flat lands on the borders of rivers and ponds in the states S. of New England. This is a vigorous perennial plant, growing with numerous erect, smooth stems, to the height of 3 to 5 feet. The leaflets are in pairs of 6 to 9, lanceolate, oblong. The flowers appear in July and August in short axillary racemes, and are of a beautiful golden yellow color. The fruit is a pendulous curved legume, swelling out at the seeds, somewhat hairy and blackish. The leaves are collected in August and September, and being carefully dried are compressed into oblong cakes as practised by the Shakers. Water or alcohol extracts the virtues of the plant, and the aqueous infusion is the usual form in which the medicine is exhibited, combined, as is common in the use of the other varieties, with some other purgative, as salts, to correct the griping action of the senna. The strength of the American senna is only about  $\frac{1}{4}$  as great as that of the foreign. The recognized species which afford the latter are *C. acutifolia*, *obovata*, and *elongata*, and it is also afforded by some others. The supplies come in part from upper Egypt and portions of central Africa. Boulaos is the great receiving place for the bales, and here they are opened, and other leaves are intermixed with the senna. New packages are then made up for Alexandria, which is the shipping port. Some supplies are delivered direct at Alexandria and escape adulteration. Tripoli also exports senna, supposed to come from Fezzan. The so called India senna, brought from Bombay and Calcutta, is a product of Arabia. Senna is an efficient purgative, and is much used in fevers and febrile complaints.

SENNAAR, a country of N. E. Africa, forming a pashalic of Egypt, and part of the territory commonly known as Nubia. It lies between Abyssinia on the E. and Kordofan on the W., and extends S. from the junction of the Blue and White Nile in lat.  $15^{\circ} 40'$  N. to lat.  $11^{\circ}$ , but its boundaries are not well defined; area estimated at 60,000 sq. m.; pop. 1,500,000. The chief towns are Khartoom, where the governor resides, Sennaar, the former capital, Wady Medineh, Messelemiah, and Golek. The country consists of a plain from 1,400 to 1,500 feet above the level of the sea. There are some isolated summits nearly 1,000 feet above the surrounding country; and toward the S. boundary the surface becomes very mountainous. The plain of Sennaar rests upon a regular horizontal stratum of sandstone, and the mountains consist of crystalline rocks, clay slate, and limestone; while many of the isolated hills are composed of granite, and some contain veins of auriferous quartz and gneiss. Iron ore is abundant, and salt is found on the White Nile and at Khartoom. The soil is a rich black mould. Rain seldom falls in the N., sometimes not for 2 or 3 years together; but in the S. it is abundant between May and September. The climate is exceedingly hot, the thermometer rising to  $120^{\circ}$  in the shade. Extensive tracts of forest extend along the banks of the White Nile, and in the lower part of the country, where the river overflows its banks abundant crops of durra and beans are raised. The elephant, giraffe, zebra, rhinoceros, antelope, lion, leopard, hyæna, baboon, camel, hippopotamus, crocodile, heron, and ibis are met with. The inhabitants are composed of a mixture of several races, and vary in color from light yellow to black. The better classes are generally well made and handsome, but about half the population are negro slaves. All classes are dissolute, idle, and drunken. They understand working in metals, and are good weavers, potters, &c. Mohammedanism is the prevailing religion, but there are many Christians and heathens in the S. E. part of the country. The precepts of the Koran, however, are little attended to; there are few mosques, and the Moslems eat pork and neither wash nor pray. Sennaar is said to have formed a part of the empire of Abyssinia, and afterward to have been annexed to Nubia. It remained independent from about the 15th or 16th century till 1822, when an army under Ismael Pasha annexed it to Egypt.

SENNHEIM. See OERNAY.

SENSITIVE PLANT (*mimosa pudica*, Willd.), an herbaceous annual with pinkish flowers in globular heads, a native of Brazil. Although the name is usually applied to this particular species, there are 10 other mimosas, and as many species of other distinct plants, which possess the same property of shrinking at the touch. Most of them belong to the natural order *leguminosæ*, and to that division known as the *mimosææ*, distinguished by their ordina-

rily compound leaves, regular flowers with long and commonly hypogynous stamens, which are in number indefinite, the corolla being valvate in estivation. Some instances are known of polygamous flowers among them. The parts of the plant subject to motion from external pressure, the jarring of the ground, or mechanical irritation, are the swellings or knots at the several joints of the leaf, so that a single leaflet, a pair of leaflets, or more, as well as the entire leaf, can be affected. Dutrochet, Meyen, Morren, Schleiden, and others, have endeavored to account for this phenomenon, but their explanations are only partial. The turgescence of the cellular tissues at these parts through the sun's rays and a heat of  $70^{\circ}$  to  $80^{\circ}$  F. in the atmosphere is apparent in the normal state of the plant; while diminished light and heat, as well as loss of sap from a cut or wound beneath the joints, evidently result in the closing and falling of the leaflets. Influenced by the last named cause, they will be found to remain in that condition until the lesion is repaired.—The sensitive plant is readily raised from seeds, and usually flowers in the summer months; but the protection of the greenhouse is needed to perfect its seed pods.

SEPIA. See CUTTLE FISH.

SEPOYS, the native soldiers of the English army in Hindostan. The word is derived by Bishop Heber from *sip*, the bow and arrow, which weapon was once used almost universally by the Indian soldiers; but it comes more probably from *sipahi*, the Persian word for soldier. The practice of employing the natives as soldiers was begun by the French more than a century ago, and was soon afterward imitated to a small extent by the English. The cheapness of the troops, and the vast extent of land to be held in subjection, led constantly to their further use, until they far outnumbered the European troops. In 1840 there were in the 3 presidencies of Bombay, Madras, and Bengal, in the pay of the East India company, 178 regiments of native troops. In 1857, at the outbreak of the great rebellion, there were in the Bombay army about 80,000 sepoys, in the Madras army about 50,000, and in the Bengal army about 120,000, beside several thousand troops employed out of Hindostan. At that time there were 38,000 European troops scattered throughout India. The sepoys were volunteer troops. Their pay was 7 rupees a month, which sum, though small to us, was double the wages of the class from which they were generally taken. After 16 years' service they received one additional rupee, and after 20 years' service two. A sergeant or *havildar* was paid 14 rupees; a *jemadar* or lieutenant 24; and a *subadar* or captain, the highest rank to which a native could attain, 67. A native regiment consisted of about 1,000 privates, 120 native non-commissioned officers, and 20 native commissioned officers; the remaining officers were European. The theory of a regiment required about 25 European officers; but

from absenteeism on furloughs, on staff appointments, or in civil duties, the number was really 12 or 15. The men were smaller in size, but as well disciplined and as hardy as the English troops. Until the rebellion in 1857 perfect confidence was felt in the loyalty of these troops; but the revolt of that year, not on the part of the Indian people, but of the native Indian soldiers, rendered a change in the organization of the army necessary. It was transferred along with the government of India to the crown, its numbers largely reduced, and the men placed on the footing of irregulars.

SEPP, JOHANNES NEPOMUK, a German historian, born at Tölz, Bavaria, in 1816. He studied at the university of Munich, and became the favorite disciple of Görres. In 1845-'6 he made a journey through Syria, Palestine, and Egypt, and on his return was appointed professor of history at the university of Munich. In 1848, in consequence of the agitation produced by Lola Montez, he was removed from his chair, together with Dollinger, Lasaulx, Philipps, and 4 other leaders of what was called the Catholic party, but was restored to it in 1850. For his ardent advocacy of the interests of the Catholic church he was created by the pope a knight of the order of the holy sepulchre. His chief works are a "Life of Christ" (7 vols., Ratisbon, 1842-'6), written to counteract that by Strauss, and *Das Heidenthum und dessen Bedeutung für das Christenthum* (8 vols., 1853), a Catholic parallel to Schelling's *Mythologie und Offenbarung*.

SEPS (Daud.), a genus of saurian reptiles of the skink family, divided by modern authors into several sub-genera. In the group the feet are very short, 3 or 4 toed with claws; the apex of the tongue is notched, the eyes lizard-like with transparent lower lid; teeth numerous and conical; body snake-like, and the scales smooth and imbricated; no femoral pores. The 4-toed seps (*tetradactylus Decresiensis*, Péron) has the nostrils in the nasal scute, and a conical tail about as long as, and hardly distinct from, the body; the color above is brownish spotted with black, the sides grayish with dark dots, and whitish below; it is about 5½ inches long, the anterior limbs ¼ and the posterior ¼ of an inch; it is found in Australia and the neighboring islands. The 3-toed seps (*hemiergis Decresiensis*, Dum. and Bibr.) is distinguished from the last chiefly by the number of the toes, of which the central is the longest; the colors and habitat are the same; the length is about 4 inches, the anterior limbs ¼ of an inch and the posterior about half as long. The common seps (*seps Chalcidica*, Merr.) has a more elongated body and shorter limbs, and the nostrils are between the nasal and rostral scutes; the feet are 3-toed. The color is bronze above, usually with 4 longitudinal darker stripes, and greenish white below; the number of stripes and the black and white markings vary; the length is 16 inches, the anterior limbs ¾ and the posterior ¼ inch. It

is viviparous, and is found in southern Europe and northern Africa; the food consists of worms, small land mollusks, spiders, and insects. An allied species (*heteromeles Mauritanius*, Dum. and Bibr.) of N. Africa has only 2 toes on the fore feet; it is grayish white dotted with black above, and whitish below; the length is 4½ inches, the anterior limbs ½ and the posterior ¼ of an inch.

SEPTARIA (Lat. *septum*, a division), concretions of calcareous and sometimes of ferruginous materials divided by veins of white calcareous spar. The turtle-like septaria are particularly described in the article CONCRETIONS. In England they are met with of similar forms to those of New York, and some are applied to economical uses. They are calcined and ground to powder to make hydraulic cement, and for this purpose are obtained in large quantities in Chichester harbor and off the coast of Hampshire, and are also procured from Harwich, Sheppy, and other places. On the coast of Dorsetshire a stratum of septarian stone is largely quarried for the same purpose. At Weymouth the turtle stones found in the Oxford clay are cut into slabs and polished, and make handsome tables.

SEPTEMBER (Lat. *septem*, seven), the 9th month of the year, but the 7th with the Romans, their year beginning with March, as the legal year did in England until the change of style in 1752. The name is still retained in most European languages, like those of the 3 succeeding months, notwithstanding their present inaccuracy. The Anglo-Saxons called it *Gerst-Monath*, or barley month, as barley, harvested in September, was their most important grain; and in Switzerland it is still called *Herbst-Monat*, harvest month. It has 80 days.

SEPTUAGINT. See BIBLE, vol. iii. p. 231.

SEPULVEDA, JUAN GINEZ DE, a Spanish historian, born at Pozoblanco, near Cordova, in 1490, died in 1574. He assisted Cardinal Cajetan at Naples in the revision of the Greek Testament, in 1529 went to Rome and entered the service of Cardinal Quinonez, and, returning to Spain in 1536, was appointed chaplain and historiographer to Charles V., and intrusted with the education of the emperor's eldest son, afterward Philip II. He wrote a work in opposition to Las Casas, to prove that the wars and acts of the Spaniards in America were just and proper, which was condemned by the universities of Alcalá and Salamanca, and never printed. Beside a number of treatises, he wrote in Latin a history of Charles V., another of Philip II., and a narrative of the Spanish conquests in Mexico. His works were published by the royal academy of history at Madrid in 1780 (4 vols. 4to.).

SEQUATCHIE, a new S. W. co. of Tenn., intersected by a branch of the Tennessee river; pop. in 1860, 2,120, of whom 201 were slaves. The surface is very hilly and the soil moderately productive. The staples are wheat, Indian corn, and oats. Capital, Dunlap.



**SEQUIN** (Ital. *zucchino*, from *zucca*, the mint), an Italian and Turkish gold coin. It was first struck at Venice about the end of the 13th century, and afterward in all the other Italian cities, and from the Levant was introduced into Turkey. The Tuscan sequin is worth \$2.30, the Turkish from \$1.10 to \$1.75. On the obverse of the Italian sequin is generally the patron saint of the city, and on the reverse simply a legend. The Turkish sequin bears on the obverse the name of the reigning sultan, with sometimes a prayer, and on the reverse the place and date of coinage.

**SERAGLIO.** See **CONSTANTINOPLE**.

**SERAJEVO.** See **BOSNA SERAI**.

**SERAMPORE**, a town of British India, in the Bengal presidency, on the right bank of the Hoogly, about 12 m. N. from Calcutta, with which it is connected by railroad; pop. about 13,000. It extends about a mile along the river, and is well built and clean. Serampore formerly belonged to Denmark, but was purchased by the English in 1845. The first Baptist mission for converting the people of Hindostan to Christianity was established here, but it has since been removed to Calcutta. "The Friend of India," one of the principal journals of that country, is published in Serampore.

**SERAPH** (Heb. *saraph*, burning or fiery), an order of angels represented by the prophets of the Old Testament as surrounding the throne of God, whom they are constantly occupied in praising with their voices. They derive their name from their dazzling or fiery appearance, and are generally spoken of in connection with the cherubim, with whom they are often identified. Those described by Isaiah had each 6 wings, with 2 of which he covered his feet, with 2 his face, and with the 2 others flew (Isa. vi. 2-6.)

**SERAPIS**, or **SERAPIS**, an Egyptian divinity, whose worship was introduced in the reign of the first Ptolemy. According to Plutarch and Tacitus, Ptolemy, warned by a dream, sent to Sinope for a colossal statue, which on its arrival at Alexandria was declared to represent the god Serapis. He must therefore have been previously known in Egypt, though he cannot be identified with either of the old national gods. The Egyptians themselves never acknowledged him in their pantheon, but he was the principal divinity in the Greek and Roman towns, and was considered to be either Osiris, Æsculapius, Jupiter, or Pluto. The temple Serapeum was built at Alexandria for the reception of the statue, and was the last hold of the pagans in that city after the introduction of Christianity. It was a magnificent structure, supported by arches, and divided within into spacious apartments. "The consecrated buildings," says Gibbon, "were surrounded by a quadrangular portico; the stately halls and exquisite statues displayed the triumph of the arts; and the treasures of ancient learning were preserved in the famous Alexandrian library, which had arisen with new splendor from its ashes."

It was destroyed by the bishop Theophilus, by order of Theodosius, in 389; and "the colossal statue of Serapis was involved in the ruin of his temple and religion." There was also a celebrated temple of Serapis at Memphis, the remains of which were discovered by M. Mariette in 1850.

**SERBATI.** See **ROSMINI SERBATI**.

**SERENADE** (Ital. *serenata*, from Lat. *serenus*, clear), literally, music performed in the open air on a clear night. Among the nations of southern Europe it signifies the amatory songs, accompanied by the guitar, with which lovers favor their mistresses at night. Any music performed in the open air at night, whether vocal, instrumental, or mixed, if of a complimentary character, is now called a serenade.

**SERF** (Lat. *servus*, a servant or slave), a term descriptive of the condition of a large portion of the people of Europe in the middle ages and in later times. Slavery and various forms of bondage prevailed throughout the whole of the Roman empire, and slavery was known to some of the races by whom that empire was overthrown; and out of the social and political conflicts produced by the barbarian invasions of the empire arose that form of society which is known as the feudal system, which existed for several centuries in most parts of Europe, and in which there were various degrees of servitude. The invaders found a portion of the agricultural populations of the countries they entered and acquired in a medium condition between servitude and freedom. These were the *coloni*, or bond laborers, who were attached to estates. In Gaul, where the feudal system experienced its greatest development, and where serfdom became the most extensive and severe in its application to the masses of the people, the German conquerors gave themselves up to the enjoyments of war and the chase, and to the grosser sensual pleasures, while their flocks were tended and their lands tilled by slaves, some of whom paid rent in kind, while others stored the produce of their labors for their masters, deducting a small amount for their own subsistence. Society was composed of lords, vassals, and slaves, and labor was almost entirely servile and compulsory. Some persons possessed more than 20,000 slaves each. The capitulary *de Villis* shows that the royal farms were cultivated by slaves, and it is estimated that they embraced a fourth part of the land. In time the benefices that were granted became heritable, so that the beneficiary exercised over the slaves not merely the power of an owner, but also that of a magistrate. The tendency of events under the Merovingian and Carolingian kings was to the increase of servitude. The revolts and commotions that were then so common had the effect of rapidly increasing the enslaved classes, by forcing free men into them. Montesquieu asserts that at the beginning of the ascendancy of the third dynasty, in the 10th century, nearly all the people of

France were serfs. The extreme sufferings of the people from famine compelled many of them to sell themselves into slavery, thus exchanging liberty for bread, which has happened in all ages, but which was a more common proceeding in the 9th century than at any other time. Others exchanged liberty for the protection of powerful men. Offenders against the laws, who could not pay the compositions demanded of them, and persons who had failed to perform their military duties, were made serfs, or were liable to be so made. Some men became the property of churches and monasteries, to receive in return such spiritual benefits as it was in the power of those institutions to give them. The liberty of the small landed proprietors was always in danger of being lost; and as their powerful neighbors did frequently seize their estates, they were not likely in all cases to neglect to seize their persons. The difference between the poor freemen and the servile classes was very great in theory, but it often happened that the former were badly treated, and degraded to the condition of the latter. After the failure of the purposes of the early kings of the Carolingian line, through the weakness of their successors, the feudal system became a necessity, and was the mode in which the influential classes sought to effect an organized society; and that implied the political and personal enslavement of most of the people. But the change that was brought about was not entirely unfavorable to the poor. The effect of the barbarian conquests had been on the whole advantageous to the slaves found in the conquered countries, though it had considerably depressed the *coloni*. The two classes of forced laborers had been brought nearer together, the more favored class suffering somewhat from the change, while the less favored class gained a little therefrom. For several centuries this state of things lasted, to the detriment of the *coloni*, or villeins, as they were called by the jurisconsults. The effect of the establishment of the feudal system, on the other hand, was beneficial to the villeins. Their condition, says Hallam, then "acquired some fixity; they were subjected to a multitude of dues, often odious and absurd; but however numerous they were, however odious, however absurd, when he had once paid them the vassal no longer owed any thing to his lord; the seigneur had not full power over his vassal; the latter was not a slave, a thing of which the proprietor might dispose at his pleasure. A principle of right soared constantly above their relations; and the weak knew, up to a certain point, that he had some ground to go upon, some theory of appeal." While the villeins thus gained from the triumph of the principle of feudalism, the serfs did not suffer, their condition being assimilated to that of the villeins, and becoming fixed. Chattel slavery ceased to exist, and they could not be bought and sold, as had previously been the case. This was principally owing to the influence of the

church, which denounced traffic in Christians. The serfs became hereditary bondmen, and were employed on the soil, with which they were transferred. The difference between the serfs and the villeins, however, was so faint in many respects that they are generally spoken of as forming one and the same class of persons, even by the highest authorities, and by writers who in other places have been careful to mark the distinction between them. This distinction was real, the villeins holding a medium position between the serfs and the ingenuous classes, or freemen. The serfs, who are sometimes spoken of as a lower class of villeins, were, in theory, in the most abject state, and practically they often were so, though, as stated, the improvement of villenage was not without its effect on the serf's condition. Beaumanoir, after pointing out the two conditions of gentlemen and freemen, says: "The third estate of men is that of such as are not free; and these are not all of one condition, for some are so subject to their lord that he may take all they have, alive or dead, and imprison them whenever he pleases, being accountable to none but God; while others are treated more gently, from whom the lord can take nothing but customary payments, though at their death all they have escheats to him." The former were serfs, the latter villeins. The villein was obliged to remain upon his lord's estate. He could not sell his lands, and his person was bound, and he could be reclaimed and brought back if he left his superior. This was the condition of both serfs and villeins; but the former were bound to the performance of ignoble services, from which the latter were exempt. "In England," says Hallam, "at least from the reign of Henry II., one only, and that the inferior species, existed; incapable of property, and destitute of redress, except against the most outrageous injuries. The lord could seize whatever they acquired or inherited, or convey them, apart from the land, to a stranger. Their tenure bound them to what were called villein services, ignoble in their nature, and indeterminate in their degree; the felling of timber, the carrying of manure, the repairing of roads for their lord, who seems to have possessed an equally unbounded right over their labor and its fruits. But by the customs of France and Germany, persons in this abject state seem to have been called serfs, and distinguished from villeins, who were only bound to fixed payments and duties in respect of their lord, though, as it seems, without any legal redress if injured by him." It was only against his lord, however, that the villein was without rights, at least in England; and "he might inherit, purchase, sue in the courts of law, though, as defendant in a real action or suit wherein land was claimed, he might shelter himself under the plea of villenage." Children generally followed the condition of their mother, but in England the state of the father determined that of the children as

far back as the reign of Henry I., the first third of the 12th century. There the law presumed that the fathers of the bastards of female villeins were free, or that bastards were the sons of nobody, and therefore could not be the sons of slaves. In France, the free woman who married a serf was treated as being of her husband's condition; and in Flanders, if a free man married a villein, he became a villein himself after living with her a year. Before the establishment of the feudal system, and under the Carolingian rule, it had been provided that a free man who had taken a villein to wife could divorce her if he had been deceived as to her condition. Villeins could not marry without their lord's consent, or they forfeited their property, or were fined. The treatment of the servile classes differed much in different countries, and villenage literally disappeared from England long before it was broken up in France. "Some faint traces of the institution of villenage" in England, says Macaulay, "were detected by the curious so late as the days of the Stuarts; nor has that institution ever, to this hour, been abolished by statute." The church was one of the principal agents in this change, so silently yet so effectively wrought, and without exciting any disturbance. It is the testimony of the most eminent of Protestant historians, that so successfully had she "used her formidable machinery that, before the reformation came, she had enfranchised almost all the bondmen in the kingdom except her own, who, to do her justice, seem to have been very tenderly treated."—In France, the institution lingered until a period within the memory of men now living; but the rise of men from a servile condition began very early in that country, and continued to go on until great changes were effected. Many of the *coloni* aspired to freedom at the time when the feudal system was in its most flourishing state, and not a few of them were successful in throwing off their bonds. Those on the estates of kings and churchmen were soonest enabled to do this, for obvious reasons. By the middle of the 13th century so many villeins had become possessed of fiefs, that even St. Louis himself, who favored the rise of the people, became alarmed, and sought to put a stop to the practice. But he did not take from them the fiefs they had acquired, which has justly been held to prove that the number of such fiefs was large, and the class of emancipated *coloni* too numerous to be assailed. Two generations earlier, Philip Augustus had provided by law that the royal investiture of any man with a fief raised him from the rank of a *roturier* to that of a noble. This had become necessary in consequence of the sale of their fiefs by nobles who were desirous of becoming crusaders. There were none but citizens of the bourgs who could purchase the property thus offered, and many of those citizens were either villeins by birth or the descendants of villeins; and until the crusades it was an established principle of

the feudal law that no *roturier* could acquire or hold a fief. The law of Philip Augustus was therefore absolutely necessary, to give validity to the new state of things that had been brought about by the action of the nobles themselves; and it was a severe blow to feudalism, of which the enslavement of the people was a necessary incident. The creation of the bourgs or communes afforded places of refuge to those serfs who fled from their lords, and thus built up a portion of society which was hostile to feudalism, and which was supported by the French kings, who were ever on the watch to increase their power at the expense of the seigneurs. Louis X., in 1315, emancipated all persons in the royal domains upon their paying a fair composition, his object being to set an example to all seigneurs; but his example was not extensively followed. Philip the Fair emancipated the villeins on the royal domains in Languedoc, but the number of freemen was always greater in southern France than in the north, except in Normandy. One of the chief effects of the crusades was to favor emancipation. Previously the obstacles in the way to emancipation were almost insurmountable. The labor of the villeins was very valuable to their lords, and a lay noble "was unable to enfranchise the serf without the concurrence of each in turn of the various other lords who, in the long chain of feudal dependence, might have an interest, mediate or immediate, or more or less remote, in the fief to which the serf belonged." To emancipate a serf on an ecclesiastical estate would have been to alienate a part of the church's property, and that property was inalienable according to the canon law. The crusades operated to change this, as military service was incompatible with the servile condition. The serf who took the cross became free, not through the force of positive law, but because opinion was so strong in his favor that his owner durst not reclaim him, either while in service or after his return. The crusades, too, by introducing unwonted habits of change of place, greatly increased the numbers of those wandering vagrants whom the law had previously presumed to be serfs, and assigned to the lord on whose property they remained beyond a year and a day, unless they acknowledged themselves to be the property of some other lord. The crusaders were soldiers of the cross, and it would not answer to deal with them as slaves. It was allowed to vagrants to declare themselves the king's vassals, and such vassals were free. Further, this movement of the people caused great additions to be made to the populations of the communes, and the gates of the communes stood constantly open to refugees; and whoever resided therein for a year and a day, being a serf at the beginning of that term, became a free man. No serf could be a *bourgeois*, for in the citizens of a bourg resided, collectively, its seigneurie; and a serf could not hold seigneurial rights. But when the serf who had taken refuge in a

bourg had acquired freedom, he became a citizen on easy terms. Before the crusades these bourgs had become so many places of refuge to men of servile condition; and the crusades led to the great increase of the number of such fugitives. Thus the communes were strengthened, and the feudal system was weakened, and with the weakening of that system was emancipation made the easier. The crusades also promoted commerce, and created new sources of wealth, which things were favorable to freedom. Nevertheless, serfdom was not abolished throughout France until the French revolution, and serfs could not be manumitted without letters patent from the king. In 1615 the *tiers état* prayed the king to enfranchise all serfs, on their paying a composition, but their prayer was not heard. It was a French rule of law, and as such put in practice concerning foreigners as early as the 13th century, that whoever entered France, being a slave, became free; but the practice of the country was very different toward the masses of the natives. That terrible insurrection known as the *Jacquerie*, which occurred in 1357, just after the battle of Poitiers, was caused by the sufferings of the people at the hands of the seigneurs, though its immediate occasion was the additional suffering that was created by the English wars. The fierceness of the peasants operated disadvantageously to their cause, as it afforded an excuse for keeping them in a subordinate condition; and from that time the progress of emancipation became slow. The triumph of the central power, too, was injurious to the servile classes, as the kings no longer had occasion to favor the people at the expense of the nobles. From the closing years of the 14th century, therefore, the condition of the French people ceased to be directly affected by those causes which previously had tended to their elevation; but general causes to that end still remained in operation, and at least prevented their condition from becoming worse.—In Italy the people had become free by the 13th century; and in some of the German countries the peasants had acquired their freedom before the close of the 18th century, but in other parts of the country they remained in a condition of modified villenage until the present century. The same remark holds of other countries of northern and eastern Europe.—In England the state of most of the laboring people was on the whole, and comparatively speaking, mild down to the time of Henry II. (1154-'89). The *villani* of Domesday Book were the *ceorls* of Anglo-Saxon law; and in the second generation after the Norman conquest the villen was mentioned as a freeman. But in the next generation he became completely dependent upon the lord, and his general condition was a very harsh one, though somewhat mitigated by the existence of legal fictions, and by opinion. "This class," says Hallam, "was distinguished into villeins regardant, who had been attached from time immemorial to a certain manor, and villeins in

gross, where such territorial prescription had never existed, or had been broken. In the condition of these, whatever has been said by some writers, I can find no manner of difference; the distinction was merely technical, and affected only the mode of pleading." Gradually the condition of the English villeins was improved, until the system silently disappeared. By the middle of the 14th century there were many peasants who had become free laborers, and who worked for wages. The English villeins of that time shared in that general aversion to servitude which led the *Jacques* to rise in France, and the rebellion that takes its name from Wat Tyler was of substantially the same nature as that in which Guillaume Callet figured, though the English revolt was a quarter of a century later than the French. After that rebellion was quelled the tone of parliamentary action toward the villeins was very severe for a time; but this did not last, either because the kings opposed it, or because anger disappeared as the cause of it faded away. From the close of the 14th century the tendency to the abolition of English villenage was very strong. The last unequivocal evidence as to its existence is believed to be a commission of Elizabeth, dated 1574, directing the enfranchisement of her bondmen and bondwomen on certain manors, upon payment of a fine; but no doubt it existed somewhat later than that period.—The Polish peasantry were enslaved by the nobles, but they were never chattel slaves; and among the causes of the fall of Poland was the serfdom that there existed. Since its partition a considerable improvement of the condition of the peasants has taken place in various provinces. In Hungary, the last remnants of serfdom were abolished by the laws of 1848. In Russia, serfdom was unknown until 1593, though chattel slavery had long existed there. Serfdom was introduced by Boris Godunoff, and in a few years all the rural populations were subject to it, with the exception of those persons who resided in the free communes constituting the crown domains. The legislation of Peter the Great transformed the serfs on private estates into a condition of chattelhood, while those on the royal domains enjoyed comparative freedom; but as great grants of land and serfs were made by the Russian sovereigns to individuals, myriads of peasants were thus converted into serfs of the lowest grade. The first sovereign who labored with success to put a stop to this practice was Nicholas. Alexander I. favored emancipation, but he succeeded only in the Baltic provinces, and there not fully. Some of the Russian nobles freed all their serfs during his reign. Nicholas was friendly to emancipation, but the circumstances of his reign were not so. Military service emancipated the serf, and also his wife and children. Alexander II. became czar in Feb. 1855, and as soon as he had restored peace, he began his labors in the cause of emancipation, proposing to free all the serfs, but

gradually. He has encountered considerable opposition, and long preparations were unavoidable. On March 17, 1861, the "imperial manifesto" emancipating the serfs was published. Two years from that date are required to effect the imperial purpose, and during that time the old system will be maintained, and as much longer as shall be necessary to perfect the arrangements for the conversion of 20,000,000 serfs into freemen. The czar tells the serfs that, "to render the transactions between the proprietors and the peasants more easy, in virtue of which the latter may acquire in full property their homestead and the land they occupy, the government will advance assistance, according to a special regulation, by means of loans, or a transfer of debts incumbering an estate." The undertaking has been commenced in a conservative spirit, but there is a strong party of the nobility opposed to it, while at the same time many of the peasants are for immediate emancipation. The tone of the "imperial manifesto" is far from being confident. The circumstances of Europe will have much effect on the movement. Peace will promote the emperor's purpose, while the occurrence of war to which Russia should be a party would probably delay its fulfilment.

**SERGEANT** (Lat. *serviens*), a non-commissioned officer in a company of infantry or a troop of cavalry, who drills or instructs in discipline the recruits, and on parade acts as marker or guide in the performance of the evolutions. The covering sergeant stands behind the officer in command of the company when the battalion is in line, and upon the command to open ranks steps into the place vacated by him; when the ranks are closed he resumes his former position. Every regiment has a color guard of from 4 to 6 sergeants, whose duty it is to protect the colors. In some services the colors are borne by these color sergeants. The sergeant major, the first non-commissioned officer of a regiment, assists the adjutant; the quartermaster sergeant acts under the regimental quartermaster in many details relating to the interior economy of the regiment; the orderly sergeant, or first sergeant of a company, communicates the orders of the day as received from the adjutant to his company officers, and warns the men for duty. In the U. S. service ordnance sergeants, selected from meritorious sergeants, are appointed to take charge of the ordnance, arms, munitions, &c., at the different military posts.—Sergeants at arms were originally officers of police who attended the person of the king and other great dignitaries, but who are now chiefly employed in the houses of parliament to execute the commands of the presiding officer, or apprehend offenders against parliamentary privileges and the maintenance of order. Officers invested with similar functions are attached to the U. S. congress and to all other legislative bodies in the Union.—A sergeant at law, in England, is a lawyer of the highest rank under

a judge. Until 1846 sergeants had the exclusive privilege of pleading in all trials at bar in the court of common pleas, but, except in the matter of precedence, the barristers are now on a professional equality with them. The judges, who are always selected from the sergeants, address the latter from the bench as brothers. Sergeants are created by the king's writ commanding them to take their degree, and no qualifications beyond having been regularly called to the bar seem to be necessary.

**SERGEANT, JOHN**, an American jurist, born in Philadelphia in 1779, died there, Nov. 23, 1852. He was the son of Jonathan Dickinson Sergeant, an active and earnest supporter of the revolution, a member of congress, and the first attorney-general of Pennsylvania. He was graduated at Princeton in 1795, and for more than half a century occupied the highest position at the bar of Philadelphia. He was a member of congress from 1815 to 1823, from 1827 to 1829, and from 1837 to 1842, and took a very active part in the proceedings on the Missouri compromise of 1820. He was one of the two envoys appointed to represent the United States in the Panama congress. In 1832 he was the whig candidate for vice-president with Mr. Clay. His "Select Speeches" were published at Philadelphia (8vo., 1832).

**SERGIPE**, or **SERGIPE DEL REI**, a maritime province of Brazil, bounded N. by Alagoas, E. by the Atlantic, and S. and W. by the province of Bahia; area, 16,200 sq. m.; pop. in 1856, 183,600. The sea coast is generally low and sandy, but inland the surface becomes mountainous. The most important rivers are the São Francisco, which forms the N. boundary line, the Vaza-Barris, the Sergipe, and Cotindiba. The chief mineral productions are rock crystal, limestone, and saltpetre. The E. part of the province, called Matas, is well wooded and fertile, and has frequent rains; but the W., called Agrestes, is subject to long and severe droughts. Coffee is cultivated on the higher grounds, and many kinds of fruit trees are grown. The forests are not very extensive, but the timber is of superior quality; dye woods and drugs are found, including ipecacuanha and cinchona. Capital, Sergipe del Rei or São Christovão.

**SERINAGUR**, or **SIRINAGUR** (the town of Surya or the Sun), the capital of the kingdom of Cashmere, by which name it is also sometimes called, situated near the centre of the valley of Cashmere; pop. about 40,000. It extends about 4 m. along both sides of the Jhy-lum, the ancient Hydaspes, and the two divisions are connected by 7 wooden bridges. The stream, which is deep and sluggish, winds through the town with much picturesque effect. The town is extremely filthy, with houses of 2 or 3 stories constructed of timbers filled up with unburned brick, and generally in a dilapidated condition. Gardens are cultivated on nearly all the roofs. The principal public buildings are the Jama Masjid or great mosque, stated to be capable of containing 60,000 persons, and

the mosque of Shah Hamedan. On the E. is a lake about 5 m. long and from 2 to 3 m. broad, surrounded by beautiful scenery, and formerly a favorite resort of the Mogul emperors, the relics of many of whose pleasure grounds and palaces still remain; the most noted is the Shalimar, laid out by the emperor Jehangheer, which Moore selected for the closing scene of "Lalla Rookh."

**SERINGAPATAM** (Hindoo, *Shri-Ranga-Patanam*), a city of Hindostan, in the kingdom of Mysore, 9 m. N. E. from Mysore; pop. about 12,000. It is situated at the upper end of an island in the river Cavery, and is strongly fortified. The whole place has a ruinous appearance. It contains a Hindoo temple, a handsome mosque, Tippoo's palace, the ancient palace of the kings of Mysore, and several other large buildings. During the reign of Hyder Ali it was several times ineffectually besieged by the Mahrattas and the Nizam; and in the time of Tippoo Sultan in 1791 it successfully resisted an attack by the British under Lord Cornwallis. The following year Cornwallis invested it, and compelled the ruler of Mysore to pay £8,300,000 and cede about half his dominions to the British and their allies. In 1799 the capital, then garrisoned by 22,000 good troops assisted by a number of French adventurers, was again invested by the British and the Nizam's forces, and after a bombardment of 4 days was taken by storm May 4, Tippoo being slain in trying to rally his troops. Treasure and jewels to the amount of \$7,500,000 fell into the hands of the victors, and were divided among the troops. The British retained possession of the town for some time as a military station, but abandoned it, as it proved very unhealthy to European soldiers.

**SEROUS MEMBRANE.** See **MEMBRANE.**

**SERPENT**, a musical wind instrument of curvilinear form, consisting of a conical tube of brass, divided into 3 parts, a mouthpiece, neck, and tail, and having 6 circular apertures for the modulation of the notes. Its compass extends from B flat below the base staff to G, the treble clef line, and its use is confined to military bands. It was invented by Edme Guillaume, of Auxerre, France, in 1590.

**SERPENT**, or **SNAKE**, the common name of the ophidian reptiles, including, according to the earlier naturalists, all air-breathing oviparous vertebrates, of elongated and rounded body, without limbs and creeping on the ventral surface. Beside these characters the body is very flexible and narrow, without distinct neck and with conical tail; bones of the face movable, making the mouth very dilatable; teeth sharp, separate, usually hooked, on both jaws and almost always on the palate; no eyelids, nor tympanum, nor apparent external auditory foramen; skin extensible, protected by thin scales covered by an epidermis which is shed in a single piece by a process of inversion; the plates of the under surface are larger, and used as instruments of progression; the male

reproductive organs are double, concealed, and capable of protrusion, which has led some to the belief that snakes have posterior limbs; the females are oviparous, and a few ovoviviparous, and the young undergo no metamorphosis after leaving the egg. The spine consists of very numerous and movable vertebrae, concave in front and hemispherically convex behind, distinguishable only into costal and caudal; the occipital condyle is single, and the jaws connected to a very movable interarticular bone; the very numerous ribs are always distinct and free at the lower end, there being no sternum nor pectoral arch. The tongue is soft and fleshy, protractile, deeply forked, and held in a sheath; the visceral organs are very long, closely fitting in the abdominal cavity; a single lung only well developed, generally the left, forming a cavity with spongy walls, and the hinder portion frequently without cells, its simple sac serving probably as a reservoir of air; opening of the cloaca transverse. The vertebrae are rarely fewer than 100, and in some boas and pythons as many as 400, presenting the largest number among animals; progression is almost always by lateral undulations, the ribs with their attached ventral plates being so many pairs of feet, like those of myriapods, in some boas more than 300 pairs; the anterior limbs are wanting, but in some boas and pythons there are horny hooks appearing externally, supported on a rudimentary pelvic arch; with these few exceptions posterior limbs are wanting. Most of the muscles are specially adapted for acting on the spinal column, and are arranged in a very complicated manner, especially those in connection with the ribs. The brain is small, and the spinal cord very long, with exceedingly numerous vertebral nerves. For other details of structure see **COMPARATIVE ANATOMY**, and **REPTILES**. Though without limbs, they execute a great variety of movements; they creep, spring, climb, swim, constrict, suspend themselves by the tail, burrow, and raise the body almost erect. Like most reptiles, they are very sensitive to cold, becoming lethargic in winter; the muscular irritability is remarkably great and persistent, depending on the spinal nervous agency and the inherent property of the muscular tissue; the heart palpitates long after it has been removed from the body, and the jaws open and shut in the decapitated head. The senses of smell, hearing, and taste are very imperfect; the eyes, without lids and constantly open, appear immovable; the principal seat of touch is in the soft and extensible tongue. The scales offer every variety of color and marking, but in most the general color resembles the objects on which they habitually live, whether sand, earth, rock, tree, or grass; the coloring matter is in the middle layer of the skin, the inner or dermis being strong and holding the scales, and the outer or epidermis shed several times a year; the animal is dull and does not eat at the period of casting its skin. These characters

are sufficient to distinguish serpents from large annelids, eel-like fishes, the scinoid and chalcidian saurians, and many elongated batrachians; they are reptiles, in the true sense of the word. For the systems of classification see HERPETOLOGY; they are generally divided into the two groups of the poisonous and the harmless; the first, like the cobra, rattlesnake, and viper, have movable fangs in the upper jaw communicating with a poison gland; the second are without this apparatus. All are carnivorous, feeding on living prey, which is swallowed whole; while some are rapid in pursuit, others crush their victims to death, or poison them, or bring them within reach of their jaws by a kind of fascination, terrifying by their hideous and menacing aspect some of the active smaller mammals and birds into a momentary loss of power. They eat and drink rarely, and are capable of sustaining very long fasts; digestion is performed very slowly; the secretion of the large salivary glands is profuse, for lubricating the food and rendering deglutition easy. For details on the poison apparatus see COBRA DE CAPELLO, RATTLESNAKE, and VIPER. The once prevalent idea that snakes suck the milk of cows and goats is a mere fable, as it would be anatomically impossible in their mouths to obtain the necessary vacuum, nor could the numerous teeth be disengaged from the teat. The stomach is little more than a prolongation of the œsophagus, and the intestines are very short; the heart is in a fibrous pericardium, and consists of two auricles, and one ventricle with two unequal apartments communicating with each other; hence a mixed arterial and venous blood is sent over the system; the growth is slow, and the life prolonged; the hissing attributed to serpents is of a faint character, produced by the slow escape of air through the mouth or nostrils during expiration, and only exceptionally would make a noise noticeable by an indifferent observer; the animal heat is low. The males are smaller, more slender, brighter, and more active than the females; no nest is made, there is no incubation (except in the python) by their body's heat, no food is stored up for the young, and no education nor parental care is necessary. The mother hides the eggs in a suitable place, and leaves them to be hatched by the heat of the sun and air; sometimes the young are brought to maturity in the mother's body, as in the vipers. There are probably not fewer than 1,000 described species, widely distributed over the world, especially in the warmer regions; doubtless many varieties from age, sex, and climate have been described as species. They have always been objects of popular aversion, their stealthy creeping movements having obtained for them a reputation for cunning, deception, and malevolence.—Fossil remains of serpents have been found in all the divisions of the tertiary age; *palæophis* (Owen), attaining a length of 20 feet, has been found in the eocene of England, showing a higher temperature than now

exists in N. Europe; many more species, probably belonging near the genus *coluber* (Linn.) if not in it, are met with in the middle and upper tertiary and the diluvium of Europe.—For interesting information concerning serpents, see Broderip's "Note Book of a Naturalist," part 13, and Buckland's "Curiosities of Natural History" (London, 1859).

SERPENT EATER. See SECRETARY BIRD.

SERPENTINE. See MARBLE, vol. xi. p. 174.

SERTORIUS, QUINTUS, a Roman general, born at Nursia, in the country of the Sabines, about 121 B. C., assassinated in 72. He distinguished himself in the campaign of Marius against the Cimbric and Teutonic, was tribune in Spain under the prætor Didius, joined the party of Cinna and Marius upon his return, and when Marius was driven from Italy raised fresh troops with Cinna and succeeded in upholding the fortunes of the party. In the subsequent triumph of Marius, Sertorius was the only one of his adherents that retained any moderation of conduct; and so strongly was he incensed by the excesses committed at this time, that after the death of their chief he put to the sword 4,000 slaves who had been the body guard of Marius, and had perpetrated every possible crime against the citizens. When Sylla returned to Italy in 88 B. C., Sertorius obtained the post of proconsul of Spain, where he governed with justice. An army having been sent against him by Sylla, he was forced after a temporary success to cross into Africa, where, joining the native princes, he defeated Sylla's general Paccianus. Returning soon to Spain, he placed himself at the head of the Lusitanians, and defeated the 4 Roman generals who held possession of the greater part of the country. His design was to found an independent power in Spain, in which the native Spaniards should enjoy equal rights with the Roman settlers. He gained the affection of the inhabitants by favors, and impressed them with a sort of superstitious awe by means of a white fawn which he pretended had been given to him by Diana. The Roman senate at length sent Pompey with a large force to take the command against Sertorius. The first battle between these leaders took place near Sucro. That portion of the force of Sertorius under the command of Perperna was beaten by the Roman legions under Metellus; but the Romans under Pompey were beaten by Sertorius, and Pompey himself was wounded. Pompey was a second time beaten on the plains of Saguntum, and compelled to withdraw beyond the Pyrenæes. In 74 an alliance against Rome was concluded between Sertorius and Mithridates, which had no notable result. Pompey in the meanwhile was reinforced from Rome, and began a second campaign; but through the whole summer of 73 he failed to bring Sertorius to battle or to gain any material advantage. In despair of honorable victory, an offer was finally made of 100 talents and 20,000 acres of land to any Roman citizen who should kill Sertorius;



and he was slain at a banquet to which he was invited by his own general Perperna.

**SERVAL** (*felis serval*, Linn.), a carnivorous animal of the cat family, a native of southern Africa. It is about 4 feet long, of which the tail is 15 inches; the color above is ochrey yellow, darkest on the back, and shading into white on the under parts; body with dark brown spots forming longitudinal marks on the neck and shoulders; inside of fore legs with 2 transverse black bands; tail tipped and ringed with black. The legs are rather long, the body slender, the head small and rounded, and the hair long and shaggy, especially on the flanks; it is about the size of the lynx, and preys upon the smaller mammals and birds; it is not very savage, and the young are gentle and sportive like the common cat. Servals are not uncommon in southern Africa, and their skins are often carried from the Cape of Good Hope to Europe, where the animal is known among furriers as the tiger cat; it is rare in museums and menageries.

**SERVANT** (Lat. *servus*, a servant or slave), in England, and in those of the United States in which slavery does not exist, a person hired to render service. In law the word has for some purposes an extended meaning, covering nearly all service; but more generally it is used in the restricted sense.—In England, there seems to be a prevailing if not a universal rule, that a domestic servant who is turned away without notice and without fault is entitled to one month's wages. There is no such rule in the United States; but where the contract is for wages payable at definite periods, and a servant leaves without cause in the interval between two of these periods, the principle of "entirety of contract" alluded to under **HIRE** might prevent his recovering compensation for his service since that interval began; and if a master turned his servant away without cause in such interval, he might be obliged to pay wages during the whole of the interval. This contract is seldom express in its provisions, but leaves them to be implied by law. If good cause exists for dismissing a servant, he has no claim against his master, although not dismissed for that cause, and although the master did not know of its existence. If a servant reserves the right to leave for a special cause, he can leave for no other cause. Thus, if he may leave "if dissatisfied," and he leaves to attend to other business, or for higher wages, or for any cause except that he is "dissatisfied," he loses all claim against his master. It seems, from the authorities, that a master is not bound to provide medical attendance or medicine for a servant, even if his need of it be caused by an accident while in the discharge of his duty. If however he employs a physician or buys medicine, he cannot charge it to the servant without his consent. The master is bound to take care of the servant and not to subject him to any exposure or danger he would not himself undergo; but he is not responsible for an accident happening in the course

of his service, unless the servant was not only exposed to peculiar danger, but the master knew this and the servant did not. It is the prevailing law both of England and of the United States, that if a master exercises due care in the choice and employment of his servants, he is not responsible to one of them for an injury received by him from the default of another, while employed in his master's service; and the rule has been applied where the person injured is not a servant, nor employed by the master, but was assisting his servants. But the master is responsible if the injury arises from the use by a fellow servant of dangerous materials supplied him by the master. If a master employs an agent to engage or direct his servants, this agent is not to be regarded as a co-servant. These rules have been applied to many cases where servants of railroad or other companies have been injured by the carelessness of fellow servants. A master is not bound to give a testimonial of character to any servant, or to give any information about him; but if he chooses to do so, he would be responsible for any injury arising, to the servant or to one who employed him, from statements wilfully false. Like many other agreements, a contract of hiring, if it cannot be wholly performed within a year, is within the statute of frauds, and cannot be enforced unless it be in writing.—There are some interesting cases in the United States as to the presumption of service, or of a contract of service, where the service is rendered to near relations. Generally, where one works for another, a contract of hiring will be presumed; and one rendering the services may recover wages or other compensation on this implied contract. But it is said not to be so where the parties are parent and child, or uncle and nephew, or where any other very near relation exists between them. So if a destitute person is employed, and supplied with necessaries, he may leave when he chooses to, but has no claims for wages while he remains, without agreement. It is certainly the law of England, and we believe it to be the law of the United States, that any person who entices away a servant of another, or his apprentice, or any person employed by him on any contract of hiring, as for example an actor engaged by the manager of a theatre, would be held responsible in damages.—A few years ago it was regarded as the law both in England and in the United States, that if an owner of a house, desiring to make extensive repairs, employed a builder, and he employed a mason, and the mason bought lime from one who was to send it to the premises, and this person sent it and employed a laborer to wheel it from the street on the land, and the laborer carelessly left an incumbrance in the street by which a passenger was injured, the injured man would have his remedy against the owner of the house. It may be safely said that this is not now the law in either country. The general principle now is, that the responsibility of the master grows out of his control

of his servant, and is measured by, and begins and ends with, that control. Thus, where A contracts with B to do a work for him, persons who are in law the servants of B are not the servants of A, and B and not A is liable for their defaults. It is true, that if the work contracted for be unlawful, or implies a public nuisance, A may still be held on grounds of public policy; and reasons of public policy also have caused the courts to hold railroad companies, nearly all whose work outside of their regular business is done by contractors, responsible not only for the tortious acts of the contractors, but for those of persons employed by contractors; but the contractors are also liable. It must be remembered, however, that railroad and other companies are responsible for the wrongful acts of those directly employed by them in their regular business, precisely as other masters are for their servants.

SERVETUS, MICHAEL, a Spanish scientific and theological writer, born in Villanueva, Aragon, in 1509, burned at the stake in Geneva, Oct. 27, 1553. His proper Spanish name was Miguel Serveto. He was sent to study law at Toulouse, but having busied himself with religious questions and become a disbeliever in the Trinity, he removed for safety to Basel, where he endeavored in vain to secure the sympathy of Ecclampadius. In his 22d year he published a learned work which he had long had in preparation "On the Errors of the Trinity" (Haguenau, 1531), maintaining that the doctrine of the Trinity has no foundation in reason, is not taught by the early fathers, rests on false interpretations of Scripture, and came into the church with the papacy. The indignation of both Catholics and Protestants was at once excited by such a book, from the flippancy and violence of its tone not less than for its positive heresies; and Servetus was banished from Basel. On his way to France he published at Haguenau a new work, *Dialogorum de Trinitate libri duo: de Justitia Regni Christi Capitula quatuor* (1532), in which he defends his former book, advances a new heresy concerning the eucharist, and claims the right of interpreting the Scriptures freely. Changing his name on entering France to Michel de Villeneuve, he devoted himself for some years to the study of medicine at Lyons (where he also worked as a corrector of the press), and afterward at Paris. He was at the university of Orleans in the year 1534. In 1535 he edited the works of Ptolemy the geographer, with Latin notes, and ventured to prefer that writer's description of Palestine as unfruitful to the account of Moses. In the next year he was graduated M.D. at Paris, and speedily became known as a learned and eloquent lecturer on medical science. In 1537 was published his *Syruporum Universa Ratio*. But his astrological speculations, his arrogant tone, and his accusations against the medical profession, brought upon him such persecution, that in 1538 he established himself at Charlieu, a small town

near Lyons. In 1540 he removed to Vienne in Dauphiné, where a friend and former pupil of his in Paris was then archbishop. In the palace of this patron he lived quietly for several years, gaining money and respect by his profession. He revised a new edition of the Bible, founded upon the MSS. of Sanctes Pagninus, which were put under the ban of the church; and gathered the materials for his great work on the "Restoration of Christianity," the MS. of which was completed in 1546, and sent to Calvin for corrections and suggestions. But it was so distasteful to the Genevan reformer, that he broke off correspondence with Servetus, retained the MS., and freely accused the author of heresy in letters to others of the Reformed clergy. The work was printed at Vienne in 1553, and the author having been betrayed was arrested and summoned before the court of that town. On April 7 he escaped in disguise from his prison and reached the frontier. His trial nevertheless went on, and he was sentenced to pay a fine of 1,000 pounds and be burned by a slow fire. The latter penalty was executed upon his effigy. The edition of his book was so carefully collected and destroyed that only 3 or 4 copies were saved. Servetus, on escaping, at first intended to find refuge in Spain, but changed his plan and determined to go to Naples. Taking Geneva in his way, he stopped there for a month, when at the instance of Calvin, who had discovered his place of abode, he was arrested and committed to the public prison. On the next day, Aug. 14, he was brought before the municipal court, accused of heresy in various forms, of publishing seditious books, of disturbing the churches, of escaping from the lawful authority, and of insulting the ancient fathers and the living divines of the Protestant church, especially Calvin. On the following days new charges were added, of Anabaptism, of pantheism, of contempt of the Bible, and of materialism. Though the result of the trial could not be doubtful, yet the proposition that the matter should be submitted to the decision of the Swiss churches was acceded to. A paper containing 38 articles was drawn up by Calvin, and, with the answers of Servetus annexed, was sent to the various churches. The opinion of all was that Servetus should be condemned as a heretic, while they differed as to the severity of the punishment. In the council of 60 summoned in October to finish the affair, the discussion lasted 3 days, but in the end the extreme party prevailed. The execution took place on a hill a short distance from the city, the reformer Farel, who had been most zealous for the destruction of Servetus, going with him as spiritual adviser. No exhortations could induce him to retract, and his last words were a repetition of his heresy. His books and the MS. which he had sent to Calvin were burned with him. The responsibility of his death is usually considered to belong to Calvin, who boasted of his share in it, and

never could be persuaded that he had been untrue to the principles of Protestantism in sending this heretic to the stake. The mind of Servetus was quick and keen, his imagination vivid, and his insight remarkable. His conjectures in medical science anticipated Harvey and Hunter. His expositions of Scripture, sometimes ingenious, are oftener visionary. His spirit was dogmatic, bold, and arrogant, while his habits of life were pure. During his life he cannot be said to have had a disciple; but after his death the name of Servetists was fixed as a stigma upon the Anabaptists of Switzerland, and accepted by the small party in that land which rejected the doctrine of the Trinity. The life of Servetus has been written by Mosheim, by Trechsel (Heidelberg, 1839), and by W. H. Drummond (London, 1848).

SERVIA (Slavic, *Serbia*; Turkish, *Syrrp*), one of the Danubian principalities tributary to Turkey, bounded N. by the Austrian Military Frontier, E. by Wallachia and Bulgaria, S. by Roumelia, and S. W. and W. by Albania and Bosnia; extreme length 200 m., breadth 170 m.; area, 22,500 sq. m.; pop. in 1854, 985,000. Belgrade is nominally the capital, but the prince and principal authorities reside and hold their courts in Kraguyevatz. The other chief towns are Semendria, Passarovitz, New Orsova, Kruhshvatz, and Gladova. The surface is broken by ramifications of the Carpathians in the N. E., the Balkan in the S. E. and S., and the Dinaric Alps in the W. The summits of the two first seldom exceed 3,000 feet in height; those of the last often attain an altitude of more than 4,000 feet. In the centre and along the banks of the principal rivers there are extensive plains. The Danube and its tributary the Save flow on the N. frontier, and for some distance on the E., and receive the drainage of the country by several streams, the most important of which are the Drin, Morava, and Timok. The mineral products include gold, silver, copper, iron, lead, coal, salt, and magnetic iron ore. The climate is severe in the uplands, but mild in the valleys; in winter the thermometer ranges between 6° and 14° F., but sometimes falls as low as 6° below zero. The low grounds are exceedingly fertile, but agriculture is in a backward state. Wheat grows luxuriantly, and other grains are raised in abundance. The vine is grown on the banks of the Danube, and the white grapes of Semendria are of excellent quality, and said to have been originally planted by the emperor Probus. Tobacco, hemp, and many kinds of fruit, particularly plums, are also raised. The mountains are nearly all covered with dense forests. Large numbers of horses, horned cattle, sheep, and swine are reared, and form the principal source of the wealth of the country. The most common wild animals are wolves, bears, deer, and foxes. The inhabitants consist almost entirely of Serbs, who are of Slavic origin. They are of light complexion, with blue eyes, are well built, brave and generous, and have considerable talent for mechanical employments. The

manufactures are of little importance, and consist chiefly of articles for home consumption. The exports consist principally of cattle, pigs, hides, wool, tallow, wax, honey, and leeches. During the year 1857 the value of the exports amounted to \$3,700,000, and that of the imports to \$2,060,000. The Danube and Save are the only rivers used for the purposes of traffic. Freedom of trade with the whole of the Ottoman empire is secured as a right to the Servians. Education is in a very backward condition. There are 4 gymnasia, 2 schools of art, 1 of agriculture, a lyceum with faculties of law, natural science, and philosophy, a theological seminary, a military academy, and by law there ought to be at least one parish school in each parish. In 1855 the number of scholars attending all the institutions was 11,281. In 1856 there were 8 newspapers published in the country. Nearly all the inhabitants belong to the Greek church. There is an archbishop at Belgrade, under whom are the bishops of Shabatz, Negotin, and Ushitzza, and 690 priests, 38 of whom are attached to convents. Other Christian sects and religions are permitted the free exercise of their creeds, as are also the Jews, but secession from the national church is strictly prohibited. The prince is bound to loyalty and obedience to the sultan, and pays an annual tribute of 2,300,000 piasters (about \$115,000); but the Porte guarantees to the principality full internal sovereignty, the free election of their princes, freedom of religion, legislation, commerce, and navigation, and the right to maintain a national army. The revenues and expenditure for the year ending Oct. 31, 1858, were estimated at 3,000,000 florins. The army, as reorganized in 1860, consists of 8 battalions of infantry, 1 of chasseurs (600 men in peace, and 1,000 in war), 2 squadrons of cavalry, 2 batteries of artillery, 1 company of pioneers, &c.; but it is estimated that the principality could raise 150,000 foot and 10,000 horse. The dignity of prince is hereditary in the family of Obrenovitch. There is a national assembly (*skuptchina*), which meets every 3 years, and is composed of 1 deputy for every 1,000 inhabitants. Turks cannot hold real estate, and are allowed to reside at only 5 places in the country. The Serbs are principally indebted to the countenance which they receive from Russia for their favorable relations with the Porte.—Under the Roman empire Servia formed the province of *Moesia Superior*. About the 7th century it was invaded by the Servi, a tribe of Slavi, who encroached by degrees upon the empire; and during the decline and fall of the eastern empire they obtained complete possession of the country of *Moesia*, and established an independent principality under a prince styled *despotes*. A daughter of the prince of Servia married Amurath I., sultan of the Ottomans; but the Servians and other Christian nations in their neighborhood, alarmed at the rapid progress of the Turks, gave battle to Amurath on the plain of Kossova in 1389. The

Christians were defeated with great loss, but the sultan was slain in the action by a Servian nobleman. Amurath II. married a sister of Prince George of Servia, but made war upon his brother-in-law in 1440, taking the fortress of Semendria, overrunning the country, and obliging George to escape to Hungary, whence he returned with assistance, and afterward recovered part of his possessions. Mohammed II. conquered Servia, with the exception of Belgrade, which was defended by the Hungarians till 1522, when it was captured by Solyman the Magnificent. Servia remained a province of the Ottoman empire till 1717, when Prince Eugene conquered a part of it and took Belgrade, which was ceded to Austria in 1718. In 1739 Belgrade was given up to the Turks, but was retaken in 1789, and restored to the sultan by treaty in 1791. In 1804 the Servians rebelled under the lead of George Petrovitch, called Kara or Czerny George, and by 1807 expelled the Turks, and established a military government, with George as its chief. (See *CZERNY GEORGE*.) In 1813 two Turkish armies entered the country, and the Servians retired before them, Czerny George seeking safety in Austria. The whole country was again reduced to a pashalik. Its present semi-independent position was conquered for it in 1816 by Milosh Obrenovitch, who in the following year was solemnly elected hospodar by an assembly of bishops and chiefs. (See *OBRENOVITCH*.) Belgrade has a small Turkish garrison, and is the residence of a pasha, who however has no direct authority in the affairs of the country. Milosh was compelled in 1839 to resign in favor of his son Milan, who soon after died and was succeeded by his brother Michael. This prince was deposed in 1842, and Alexander Karageorgevitch was chosen hospodar. A revolution in Dec. 1858, restored Milosh to power; and on his death in Sept. 1860, his son Michael succeeded him.

**SERVIAN LANGUAGE AND LITERATURE.** The Servian language forms, together with the Russian and Bulgarian, the eastern stem of the Slavic languages. It is, in the wider sense of the word, in which it is frequently called the Illyrian, a collective appellation, comprising the languages of the Servians proper, the Croats, and the Sloventzi or Vindes. The first of these dialects is spoken by the Servians, in the principality of Servia and in Hungary (in which country they are called Rascians), by the Bosnians, the Montenegrins, the Slavonians, and the Dalmatians; the second in the Austrian province of Croatia; the third in the Austrian provinces of Styria, Carinthia, and Carniola. Those Servians who belong to the Greek church use the Cyrillic alphabet, while those belonging to the Roman Catholic church (comprising part of the Servians, part of the Bosnians, part of the Slavonians, nearly all the Dalmatians, the Croats, and the Sloventzi) have adopted the Roman alphabet. Among the Dalmatians, in

former times, the Glagolitic alphabet was in use. (See *GLAGOLITIC*.) Altogether, according to an estimate of Schafarik, the Servian language is spoken by about 7,250,000 persons, of whom more than 4,500,000 live under Austrian, more than 2,500,000 under Turkish, and about 100,000 under Russian rule.—There are in the Servian language 4 declensions of substantives, and 2 of adjectives; the dual number has become extinct, but the instrumental and the locative cases are found as in other Slavic languages. The comparative of the adjective is formed by annexing a syllable, generally *yi*; the superlative by prefixing a syllable to the comparative (*nay*). The verb, which is inflected after 8 conjugations, lacks a subjunctive, which is supplied by circumlocution, and a passive, which is expressed by means of a special participle. The tenses are the present, the future, the imperfect (with iterative signification), and the preterite. Of the prepositions, some govern the genitive, others the dative or accusative, and the accusative and locative, others the accusative and instrumental, others the genitive and instrumental. The Servian surpasses all the other Slavic idioms in euphony, and has often been called the Italian of the Slavic family of languages. The language of the eastern Servians has received many Turcisms, but they have not affected the essential structure of the language. The best grammatical work on these languages is the Servian grammar (in the Servian language) by Vuk Stefanovitch Karajitch, of which Jacob Grimm published a German translation (Berlin, 1824), with an excellent introduction. A grammar of the Croatian language was published by Berlic (Agram, 1842); one of the Dalmatian by Babukic (a German translation by Fröhlich, Vienna, 1839). Of the language of the Sloventzi we have a grammar from one of the most eminent Slavic scholars, Kopitar (Laybach, 1808). A dictionary of the Servian language has been published by Vuk Stefanovitch; an Illyrian-German and German-Illyrian dictionary by Richter and Ballmann (2 vols., Vienna, 1839-'40); a German-Illyrian by Mazuranic and Uzarevic (Agram, 1842); an Illyrian-Italian-Latin by Stulli (Ragusa, 1806).—The Servians who belong to the Greek church had no literature in their own language until the middle of the 18th century. Their writers used the old or Slavonic language, which however was generally mixed with the popular dialect. The most ancient remnants of this style reach back to the 11th century, and consist principally of documents, diplomas, acts of government, &c., a collection of which was published at Belgrade in 1840. Among the most ancient writers of Servia are Stephen, the first king of Servia (1195-1224), who wrote the history of his father; his brother, Archbishop Sava (1169-1237), who wrote monastic rules and other works; Dometian (about 1268), who wrote biographies of saints; and especially Archbishop Daniel (1291-1338), the author of the chief work on

the ancient history of Servia, called *Radoslov* ("Genealogical Register"). Of great importance also are the statutes of King Stephen Dushan (1336-'56). Many other important remnants of the ancient literature of Servia are believed to lie buried in the convents of the principality. The first Servian print extant (an octateuch) is dated 1493, published at Zenta in Herzegovina; in 1552 the Gospels were printed at Belgrade, and in 1562 a new edition at Negromonte. During the following two centuries Servian literature seems to have been almost entirely dead, the only work of note being a "History of Servia," from the origin of the people until the reign of Leopold I., by Brankovitch (1645-1711). A partial revival began in 1758, when a Slavic press was founded at Venice. The archimandrite J. Raitch (1726-1801) gained a lasting reputation by his "History of the Slavi" (4 vols., Vienna, 1792-'5). But the first who undertook to write a work in the popular dialect was Dosithai Obradovitch (1739-1811), a monk, who for 25 years had travelled all over Europe, and died as senator and instructor of the children of the celebrated Czerny George. His complete works were published at Belgrade in 1833 in 9 vols. A still greater influence on the general adoption of the popular language for literary purposes was exercised by Demetrius Davidovitch, who from 1814 to 1822 edited at Vienna the first Servian newspaper, and especially by Vuk Stefanovitch Karajitch (born 1787), the author of the first Servian grammar and dictionary, and of a large number of other works. He fixed the present Servian alphabet, and reduced the language to certain general rules and principles. His collection of the Servian popular songs (4 vols., Vienna, 1814-'38) drew the attention of foreign nations to the beauty of the Servian national songs, which have since won the general admiration of the literary world, and are believed by many competent critics to have in some respects no parallel in the history of literature since Homer. In Germany, a general interest in them was excited by Goethe, Talvi (*Volklieder der Serben*, 2 vols., Halle, 1825-'6), J. Grimm, and others; and many translations have since been published. (See Kapper, *Volklieder der Serben*, 2 vols., Leipsic, 1852.) In England some of the songs have been made known by Bowring's "Servian Popular Poetry" (London, 1827), and Robert Bulwer's ("Owen Meredith") *Serbaks Poesie* (London, 1861). Among the best modern Servian poets are Simeon Milutinovitch, the author of a national epic, *Serbianka* (Leipsic, 1826), describing the Servian war of 1812, and of a history of Servia during the years 1813-'14 (Leipsic, 1837), and Archbishop Mushitzki of Carlovitz, whose works were published at Pesth in 1838. The chief seats of Servian literature are Pesth, Neusatz, and Belgrade. One political newspaper appears in Austria, and another in Servia. In Montenegro, the capital, Cettigne, is the seat of some literary activity, and the late

*eladika*, Peter Petrovitch Niegosh, must himself be mentioned among modern Servian poets. Collections of the popular poetry of this province have been published by Tchubar Tohoikovitch.—Among the Roman Catholic Servians, the Dalmatians had as early as the 12th century an interesting literature. An old chronicle of 1161, written in the Slavic language by a priest of Dioclea, is still partly extant in the original, and wholly in a Latin translation. Toward the close of the 15th century the city of Ragusa became an Illyrian Athens, and produced many distinguished authors, especially poets. In the 19th century great efforts have been made by Dr. Gaj, editor of an "Illyrian National Gazette," at Agram, and by others, to unite all the Servians using Roman letters (the Dalmatians, Slavonians, Croats, and the Catholic Servians in Hungary), who, though speaking one language, had very divergent ways of writing it, upon a new system of orthography, and thus to give a new impulse to the development of an "Illyrian" literature, which name they preferred, in opposition to the Greek Servians, to the name "Servian."—The Sloventzi or Wenda, as the discovery of some old manuscripts in the library of Munich shows, were earlier acquainted with the art of writing than any other Slavic tribe; but the development of a national literature did not begin until the reformation of the 16th century, when Truber, the reformer of Carniola, translated the New Testament into the Wendish language. With the suppression of the reformation the development of the national literature was also arrested. In modern times the language has been again cultivated, and some works, mostly religious, have been published in it, but they are of no great account. The great national movements, now pervading Turkey and Austria, make a consolidation of all the branches of the Servian language into one, and the early beginning of a new era in the history of a united Servian literature, highly probable.—The most complete account of the history of Servian literature, in English, is given in Talvi's "Historical View of the Languages and Literature of the Slavic Nations" (New York, 1850).

SERVICE TREE (*pyrus sorbus*, Gärtner), a tree indigenous to middle Europe, growing 50 to 60 feet high, with pinnated leaves of 7 to 8 pairs of leaflets and an odd one at the apex, villous beneath, irregularly serrate; flowers in umbels, white and showy, expanding in May and June; fruit large, fleshy, either apple or pear shaped. This species is the true service tree, there being several others of less importance, all however belonging to the natural order *pomaceæ*, and closely allied to the rosaceous families. When the fruit of the service begins to decay, it is sometimes eaten, but is not prized; a very good cider or perry, with a singular disagreeable snell, can be made from it; from its astringency it is medicinally employed, the fruit being dried and reduced to a powder. The wood of the trunk is remarkable

for hardness and compact grain, and if thoroughly seasoned is valuable in manufactures; it also receives a fine polish.—The American service (*P. Americana*, De Candolle) is more commonly called the mountain ash, resembling the European mountain ash, but considered specifically distinct. It is a low tree 15 to 25 feet high, though usually a bushy shrub; its leaves are composed of 13 to 15 leaflets, which are lanceolate, taper-pointed, smooth, and sharply serrate; its flowers are white, and are borne in large flat cymes. It is much prized for its beauty both when in flower and when in fruit, the bunches of scarlet berry-like pomes hanging long after the early frosts. It is most frequently found in rocky woods on the sides of hills, and ranges from New England to Wisconsin northward, and along the sides of the Alleghany mountains southward.

**SERVITES**, or **SERVANTS OF THE VIRGIN MARY**, a monastic order in the Roman Catholic church, founded at Florence in 1233, by 7 rich merchants of that city. Its main object was the glorification of the Virgin Mary. In 1239 its members settled as hermits on Monte Senario near Florence, but soon organized themselves as monks, and adopted the rule of St. Augustine. In 1251 they elected Monaldi, one of the 7 founders, their first general, and in 1255 they were confirmed by Pope Alexander IV. They soon spread to France, the Netherlands and Germany, and other parts of Europe. From Pope Martin V. they obtained all the privileges of the mendicant orders. A new community of hermits, in accordance with the primitive practice of the order, was established by Bernardino di Ricciolini in 1593, and spread through Italy and Germany. A female branch of the order was organized soon after the original foundation, but never became numerous. Like the other mendicant orders, the Servites had also an order of Tertiarians (see **TERTIARIANS**), which became very numerous in Germany, and counted among its members an empress of Austria. Pope Paul V. in 1617 organized them as a congregation. (See **RELIGIOUS ORDERS**.) The male branch of the Servites in 1860 had 17 houses in Italy, 13 in Germany, 3 in Hungary, and 1 in Switzerland. The congregation of female Tertiarians had in the same year but 2 houses in Italy and 2 in Germany.

**SERVIUS TULLIUS**, the 6th king of Rome, reigned from 578 to 564 B. C. Three traditional accounts of his birth exist: one, that he was the son of Ocrisia, a slave of Queen Tanaquil, and of a god; another, that his father was a client of Tarquinius Priscus, and his mother a slave; and a third, that he was a son of Servius Tullius, a man of royal descent, in Corniculum, who was killed when his city was taken by the Romans. One day, while he was asleep, flames appeared about his head, whereupon Tanaquil prophesied that the boy would do great things. He grew up in great favor with the king Tarquinius Priscus, and received in marriage one of his daughters. The sons of

Anens Marcius, fearing that he would be made heir to the throne, put the king to death; but Tanaquil declared that Tarquinius was not mortally wounded, and caused Servius Tullius to rule in his name. Servius not long after assumed the sovereign power. His reign was marked by no great military exploits. He added to the city the Viminal, Esquiline, and Quirinal hills, divided the people into tribes, classes, and centuries, and gave an entirely new constitution to the state. His love for the commons and his regard for their interests awakened the jealousy of the nobles, and a horrible tragedy was the consequence. His two daughters were married to the two sons of Tarquinius, and both wives and husbands being of unlike natures, Lucius Tarquinius secretly killed his wife, and married his sister-in-law Tullia, who had murdered her husband. Lucius then plotted with the nobles against the king, and in the summer when the commons were gathering their harvests, entered the forum with a band of armed men, and seated himself on the throne before the doors of the senate house. Some of his followers slew the king on the way toward the Esquiline hill, and left his body in the road where not long after the chariot of his daughter Tullia was driven over it. Many of the incidents of this reign are unquestionably fabulous, but some are based on historical groundwork. What are called the walls of Servius Tullius were the walls of Rome down to the time of the emperor Aurelian, and "the good king Servius Tullius and his just laws" were always objects of fond regret to the Roman commons when suffering under the oppression of the aristocratic families. His constitution, which is without doubt historical, was swept away entirely during the reign of his successor.

**SESOSTRIS**, the Greek name of the greatest of the early kings of Egypt. Diodorus calls him Sesoosis, and he is by some supposed to be identical with Osirtasen I., and by others with Sethos or Rhameses II., whose reign according to Wilkinson lasted from 1811 to 1245 B. C. According to the tradition, his father had all the male children of the same age in the kingdom educated and trained in military practices with his son, so that they might become attached to his person, and be capable of enduring all the hardships to which they would be exposed. As soon as they were grown up, Sesostris was sent with an army into Arabia, which he conquered, and then into the countries west of Egypt, where he succeeded in subduing most of Libya. As soon as he ascended the throne, he assembled an army of 600,000 foot, 24,000 horse, 27,000 war chariots, and a fleet of 400 ships, with which he set out to conquer the world, it having been prophesied to him that he would become the master of the whole earth. He compelled the Ethiopians to pay an annual tribute of gold, ebony, and ivory, extended his conquests in Asia beyond the Ganges, crossed over into Europe and subdued the Thracians, and after an absence of 9 years re-

turned to Egypt. Arriving at Pelusium, he was there nearly burned to death in his tent with his wife and children by the treachery of his brother Armais, whom he had made regent of Egypt during his absence. He brought back with him an immense number of captives, whom he employed in executing the various great works, the construction of which occupied a large share of the remainder of his life. He dug numerous canals to irrigate the country, protected cities by high mounds against the inundations of the Nile, erected temples in every considerable place, and built a wall from Pelusium to Heliopolis 1,500 stadia in length. Although it is possible that the deeds of several kings may have been confounded with those of Sesostris, there can be no doubt of his existence. In all countries through which he passed he erected columns, inscribed with records of his victories. Two monuments of Rhameses II. still exist in Syria and Asia Minor, and are generally identified with the pillars of Sesostris seen by Herodotus. Sesostris is said to have destroyed himself in consequence of having become blind, after a reign of 66 years.

SESTERCE (Lat. *sestertius*), an ancient Roman brass or silver coin, worth  $\frac{1}{4}$  of a denarius, or originally  $2\frac{1}{2}$  asses, whence its name (*semit tertius*, the third a half, the Roman expression for two and a half); but the denarius being early divided into 16 instead of 10 asses, the sesterce became equal to 4 asses. Its value down to the time of Augustus was 4.1 cents, and afterward 3.6. The *sestertium* was 1,000 sesterces, and large sums were often counted in sestertia. There was a common formula for the expression of that value in thousands, as: *SS*, 1,000 sestertia; *bina SS*, 2,000; *dena SS*, 10,000; and *centena SS*, 100,000.

SESTINI, DOMENICO, an Italian numismatist and traveller, born in Florence about 1750, died there in 1832. After taking holy orders, he visited Rome, Naples, and Sicily in 1774, and at Catania became librarian to the prince of Biscari, and keeper of his cabinet of antiquities. In 1778 he went to Constantinople, and, in the capacity of tutor to the sons of the Neapolitan ambassador, traversed a large part of the Turkish empire. He spent several years in travel to collect medals for Sir Robert Ainslie, the English ambassador, afterward examined the principal numismatic collections of Europe, and in Prussia was made by the king superintendent of his museum. In 1810 he went to Paris, and in 1812 was appointed antiquary and librarian to the princess Eliza of Tuscany, in which posts he was retained by the grand duke Ferdinand III. when he resumed his throne, with the title of honorary professor in the university of Pisa. He afterward arranged Count Wiczay's rich collection of medals at Hederwar in Hungary. After his death the grand duke Leopold II. purchased his library and MSS., including his great work, *Sistema numismatico* (14 vols. fol.). He wrote more than 30 volumes on numismatics, beside numerous works of travels.

SESTOS, or *Sæstus*, in antiquity, the principal city of the Thracian Chersonesus (now peninsula of Gallipoli), situated on the Hellespont opposite Abydos, from which it is distant about 4 miles. Though never a large town, it was long of great importance, being from its position the usual point of departure for those crossing over from Europe to Asia. Its chief celebrity is from its connection with the romantic story of Hero and Leander, the former of whom was a priestess in the temple of Venus at Sestos. The western end of the bridge by which Xerxes crossed the Hellespont was a little to the south of Sestos; and from its port the army of Alexander sailed over into Asia. At a later period Strabo speaks of it as a place of some commercial importance, but nothing is known of its subsequent history. Its site is now called Yalova.

SETH, or TYPHON. See DEMON, vol. vi. p. 368.

SETON, ELIZA ANN, the founder of the sisters of charity in the United States, born in New York, Aug. 28, 1774, died at Emmitsburg, Md., Jan. 4, 1821. She was the daughter of Dr. Richard Bayley, and in her 20th year was married to Mr. William Seton, with whom she went to Leghorn for his health in 1803. Mr. Seton dying there, she returned to New York, was received into the Roman Catholic church, and, being in a measure dependent upon her own exertions for support, removed with her children to Baltimore and opened a school. She already manifested a strong tendency toward the religious state, which she was enabled to carry out more effectually in 1809, when, having received an ample endowment from a gentleman named Cooper, she opened a semi-conventual establishment at Emmitsburg. New members soon presented themselves; a habit was adopted, and a regular rule of life laid down, which was shortly after assimilated to that of the sisters of charity founded in France by St. Vincent de Paul. Their first charge outside of their own house was that of an orphan asylum in Philadelphia, to which three sisters were sent in 1814. In 1817 an act for the incorporation of the sisterhood was passed by the legislature of Maryland. Mrs. Seton's life has been written by the Rev. Charles J. White (12mo., New York, 1853).

SETTER (*canis index*, Caius), a well known sporting dog of the hound group. The head is remarkably developed and the brain very large, and the animal evinces an intelligence, affection, and docility not surpassed in any other kind of dog; it is gentle, not quarrelsome, rather timid, but bears fatigue better than the pointer; the hair is long and silky. The figure is intermediate between that of the pointer and spaniel, and it is generally considered as descended from the crossing of these two varieties; it resembles a large breed of the spaniel, and is probably of Spanish origin; the hair is less smooth than in the pointer, with much of the wavy character seen in the spaniel, even on the ears. The best breeds are



considered to be those of England and Ireland; the most ancient colors were deep chestnut and white; the English setter is generally white with large spots or blotches of liver color or reddish brown; many are marked with black. The natural instinct to crouch at the sight or scent of game has been cultivated in the setter; but they have been taught also to point with the fore foot raised, so that practically the setter and pointer are used in the same way and have similar habits in the field; they are used only as gun dogs and for birds; their sense of smell is very acute. They take to the water better than the pointer, and are better dogs in close coverts; they will work well with pointers; in the United States they are taught to bring game; they will almost always point at the scent of turkeys, but not of other domestic fowls; they are less liable to be sick than pointers. Many setters crouch, and extend their legs in front and behind, with the nose to the ground. A cross between the setter and pointer, though not a good-looking dog, would probably in time make a valuable breed.

**SETTLEMENT.** I. Under the poor laws, the right which one acquires to be considered a resident of a particular place, and to claim relief from such city, town, or village, if he is so poor as to stand in need of it. The conditions determining settlement are almost entirely prescribed by statutes, which provide generally in respect to adults that their residence in any place for a defined term of years gives them a settlement therein. A married woman has the same settlement as her husband, though if he has none within the state it may be provided that her own at the time of the marriage, within the state, is not lost nor suspended. Legitimate children have the settlement of the father, or of the mother if the father has none in the state. Illegitimate children take the settlement of the mother. Serving under articles of apprenticeship or as a servant for wages for one year gives a settlement in New York. In Massachusetts and other states certain property qualifications, the payment of taxes for a certain number of years, and rather long terms of residence, are essential to the acquirement of a settlement. II. In the limitation or disposition of property, a deed or instrument commonly made previous to or in contemplation of marriage, the object of which is generally to limit property in such modes and to such uses as will assure a provision for the wife and the issue of the marriage. Settlements may be made by the wife, but then they are very often made in consideration of a settlement by the husband; or they may be made mutually by husband and wife upon a separation, during the coverture. The common law troubles itself but little with the at least equitable right of a woman to retain after her marriage some certain and inviolable enjoyment of her own property. At common law the husband acquires absolute title to all the personal property of which the wife is ac-

tually possessed at any time during the existence of the marriage relation. All her choses in action he may convert into possession for his own benefit; he may take all the rents of her real property; and he has, if not an actual, yet always during her life a contingent, estate by the courtesy in her lands. Chancery has interposed so far as it could to mitigate this rigor of the common law. It had no power to nullify the law, yet whenever the husband was compelled to seek its assistance in order to reach the wife's property, chancery obliged him to make equitable settlements out of it in the wife's behalf. It invented also and supported, for the wife's benefit, the contrivance of a separate use and estate; and it favored those contracts, named settlements, which, employing the equity devices of uses, trusts, and powers, were framed for the purpose of securing, by express stipulation, this same benefit of a separate estate for the wife. The legislature came in time to reform the law in the same direction, and has enacted, both in England and the United States, those "married woman's statutes" which, within the last 20 years, have materially revised and improved the common law touching the rights of husbands over the estates of their wives.—In general, every person who may alienate his property may make a settlement of it. All persons therefore of full age, and masters of their estates, may settle them as they please. Yet a woman, even if she is of full age, cannot in contemplation of marriage, without the knowledge of her intended husband, make a settlement of her property real or personal; the disappointment of the future husband's expectations respecting the property of the wife is a fraud on the part of the latter, and invalidates the settlement. Nor, at common law, can a woman under coverture make a settlement without the concurrence of her husband, unless she is acting under a power or is disposing of property which she holds in her separate right. Respecting infants, it was decided in the English equity court after much controversy that a female infant could not be bound by any agreement, by way of settlement, entered into by her during her minority respecting her real estate; unless some act was done subsequently to the marriage to bind the settlement, the real estate would descend to the heirs of the infant settler discharged of the limitation. Though it had been held that a male infant might bind himself by a settlement, yet it seemed to be the better opinion that he was included in the reason of the rule that had been laid down in respect to the female infant, and was equally relieved of the obligation of a settlement of his real property. Great inconvenience and disadvantage having arisen however from this state of the law, a statute was passed in 1858, which enabled male infants at the age of 20 and female infants at the age of 17, with the approbation of the court of chancery, to make valid settlements, or con-

tracts for the settlement of all their property, real or personal, whether in possession or in reversion, remainder, or expectancy.—Settlements or agreements for settlements may be made before marriage or after it. Equity will enforce ante-nuptial agreements, provided they are fair and valid, and do not contravene the general policy and principles of the law. A subsequent marriage is consideration enough to support an otherwise voluntary deed. Post-nuptial settlements may be made either voluntarily or in pursuance of articles entered into prior to the marriage. In the latter case, the marriage being of itself a valuable consideration, the settlement is valid both against creditors and purchasers. A voluntary settlement made after marriage, and not resting on any ante-nuptial agreement, is in general void as against creditors existing when the settlement was made; yet it may be good, if made for a consideration which bears a reasonable proportion to the amount tied up by the settlement. The concurrence of a wife in destroying an existing settlement, and her joining in barring her dower, have been held sufficient considerations to support settlements which would otherwise have been held voluntary and invalid.—In framing marriage settlements it is expedient to vest the property in a trustee, though this is by no means indispensable. The control of the separate estate may be committed to the wife. Regard must be had to the provisions of the statutes which fix the limits to the suspension of the power of alienation, and to the statutes respecting trusts and powers which are enacted as checks upon the disposition to tie up property in certain hands.—The necessity of making settlements is materially lessened by the very general enactment of the so called married woman's statutes to which we have already referred. It is the chief object of the statutes to give the wife rights, independent of the husband, to take by inheritance, or by gift, grant, or bequest, any real or personal property; to hold it to her sole and separate use; to dispose of it as she pleases during her lifetime, and to demise it as she will at her death. The New York statute of 1860 enacts that the wife's personal property at the time of the marriage shall remain hers solely and separately after the marriage.

SETUBAL, *St. Ubes*, or *St. Elbes*, a seaport city of Portugal, province of Estremadura, situated on the N. side of a bay of the same name, 18 m. S. E. from Lisbon; pop. 15,201. It stands in a valley surrounded by heights, is encircled by old walls, and defended by a castle and a few forts on the adjoining hills. The quays are broad and the harbor is extensive, but its entrance is much incumbered by sand banks. The well known *St. Ubes* salt of commerce is manufactured here; the other chief exports are wine, grain, and fruit, which are also largely produced in the vicinity; and many of the inhabitants are engaged in fishing. The environs are very picturesque and fertile. Setubal is a

place of great antiquity, and is said by the Portuguese to have been founded by Tubal, the grandson of Noah. It suffered severely from the earthquake of 1755, which was so disastrous to Lisbon.

SEVENTEEN YEARS' LOCUST. See *HARVEST FLY*.

SEVENTH DAY BAPTISTS, a religious denomination known in England as Sabbatarians, where they have existed since the early part of the 17th century. In the United States they originated at Newport, R. I., in 1671. Their views of baptism, communion, and doctrine generally, correspond with those of the Baptists. Their peculiarity is the observance of the 7th instead of the 1st day of the week as the sabbath. The members of this denomination are scattered through Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Virginia, Ohio, Wisconsin, Indiana, Illinois, and Iowa, the greater number however being in Rhode Island and New York. They have a prosperous mission at Shanghai, China; 4 academies, at Alfred and De Ruyter, N. Y., Shiloh, N. J., and Milton, Wis.; a sabbath tract society; and a publishing society, which has published several books, and issues a weekly, a monthly, and a quarterly periodical. There are in the United States 68 churches, 72 ordained ministers, and about 7,500 communicants.

SEVERN, next to the Thames the largest and most important river of England, rising in the S. part of Montgomeryshire, and falling into the Bristol channel, 10 m. S. W. of Bristol, after a generally S. E., S., and S. W. course of 210 m. Its most important tributaries are the Tern, Teme, Upper Avon, Wye, and Lower Avon. It is navigable 178 m. from its mouth, and the navigation has been greatly improved and extended by locks and canals. Below Gloucester the banks are so low that the country has sometimes been inundated, and extensive embankments have consequently been raised. At Chepstow the tide rises 60 feet, and the tidal wave or bore comes in with a loud noise and a perpendicular height of 4 or 5 feet.

SEVERUS, *ALEXANDER*. See *ALEXANDER SEVERUS*.

SEVERUS, *Lucius Septimius*, a Roman emperor, born of a family of equestrian rank near Leptis, Africa, April 11, A. D. 146, died in York, Britain, Feb. 4, 211. He studied law at Rome with Papinian, by whom he was afterward succeeded as *advocatus fisci*. His interests being promoted by his kinsman the consul Septimius Severus, he held successively many offices under Marcus Aurelius and Commodus, at Rome and in the provinces, gaining the favor of the people whom he governed, especially in Gallia Lugdunensis, by his integrity and moderation, combined with great firmness. When Commodus was assassinated (192) Severus was commander of the army in Pannonia and Illyria; and after the brief reign of Pertinax and the sale of the empire by the praetorian guard to Didius Julianus, he was proclaimed

emperor by his troops at Carnuntum, and at once marched with great celerity upon Rome, announcing himself as the avenger of Pertinax. The feeble efforts of Julianus to oppose his progress, to dispose of him by assassination, and finally to divide the empire with him, were fruitless; and no sooner had he appeared before Rome (June, 193) than he was acknowledged emperor by the senate, and Julianus deposed and killed. His first care was to disarm and banish the prætorian guard, and punish with death all concerned in the murder of Pertinax, whose obsequies he celebrated with great magnificence and divine honors. At the same time with himself, Clodius Albinus, commander of the Roman forces in Britain, and Pescennius Niger, in Syria, had each been proclaimed emperor by his army. The former, whom he most feared, Severus associated with himself as Cæsar; and against the latter, having distributed an immense donative to the troops and made provisions for internal administration, he marched within 80 days after his arrival at Rome, defeated his legate Æmilianus near Oyzion, and himself near Nioc in Bithynia, and again on the gulf of Issus, where 20,000 of the Syrian army are said to have been killed. Niger was slain, and his head displayed on a pole before the besieged defenders of Byzantium. That city held out obstinately for 3 years, when it was taken (196) and devastated and dismantled, Rome being thus deprived of its strongest bulwark against the Asiatic barbarians. Meanwhile Severus had crossed the Euphrates and subdued the border tribes. He next attempted to procure the assassination of Clodius Albinus, who, hearing of his intention, passed over into Gaul and prepared to defend himself, and Severus marched against him. The armies, each 150,000 strong, met near Lyons, Feb. 19, 197; and after a terrible slaughter, during which Severus came near losing the battle and his life, Albinus was routed, and died by his own hand. Severus, having feasted his eyes upon the body, and trampled it under his horse's feet, ordered the head to be cut off and carried to Rome, whither he soon followed, and put to death the family of Albinus, as he had previously that of Niger, beside many senators and others. Soon after, the Parthians having again risen, he took and plundered Ctesiphon and other cities, but was less successful in a campaign against the Arabs. After spending 8 years more in settling the affairs of Arabia, Syria, and Egypt, he returned to Rome in 202, and gave shows and distributed money with unparalleled profusion, on occasion of his son Caracalla's marriage, and the completion of the 10th year of his reign. The next few years were passed in prosperous though rigorous administration at Rome, but were disturbed by the discord and profligacy of his sons Caracalla and Geta, both of whom he associated with him in the government as Augusti. In 207, a war breaking out in Britain, he went thither with them in order to withdraw them

from the evil influences at Rome, though he himself, from age and the gout, had to be carried on a litter. Caledonia was overrun by his soldiers to the northern extremity of the island; but, without meeting an open enemy, 50,000 of them were destroyed by the inhospitable nature of the region and the attacks of concealed foes, and Severus retired southward and commenced building the wall known by his name. The Caledonians, who had nominally submitted, again rebelled, and he was preparing for a new campaign, and threatening their utter extermination, when he died, after a reign of nearly 18 years. Septimius Severus was an enlightened ruler as regarded the administration of justice and care of the public welfare, which he jealously guarded as the most efficient instrument of his ambition. Roman jurisprudence, under Papinian, Ulpian, and others, reached its highest state during his reign; and at his death there were corn and oil in the public stores sufficient for the entire consumption of Rome and all Italy for many years. But he was at the same time superstitious and destitute of moral principle, unscrupulous and despotic. Ignoring the authority of the senate, he concentrated in himself the whole legislative and executive power, making the prætorian prefect the head not only of the army, but of the finances and the law, and was, as Gibbon says, "the principal author of the decline of the Roman empire."

SEVIER. I. A S. W. co. of Ark., bordering on Texas and the Indian territory, bounded S. by Red river and intersected by Little river; area, 1,800 sq. m.; pop. in 1860, 10,516, of whom 3,866 were slaves. The surface is diversified and the soil moderately fertile. The productions in 1850 were 142,030 bushels of Indian corn, 21,073 of sweet potatoes, 2,254 bales of cotton, and 47,684 lbs. of butter. There were 8 churches, and 294 pupils in public schools. Capital, Paracliffa. II. An E. co. of Tenn., bordering on N. C., and traversed by French Broad and Little Pigeon rivers; area, 520 sq. m.; pop. in 1860, 9,122, of whom 538 were slaves. Much of the surface is mountainous, and the soil along the streams is fertile. The productions in 1850 were 375,940 bushels of Indian corn, 63,839 of oats, and 62,571 lbs. of butter. There were 20 grist mills, 6 saw mills, 4 tanneries, 9 churches, and 1,000 pupils attending public schools. Limestone and iron ore abound. Capital, Sevierville.

SÉVIGNÉ, MARIE DE RABUTIN-CHANTAL, marquise de, a French epistolary writer, born in Paris, Feb. 5, 1626, died April 18, 1696. Left an orphan at the age of 6, she was brought up at first by her maternal grandfather, and afterward by her uncle, the abbé de Coulanges, whom she used to style in her letters *le Bien-Bon*. The utmost attention was given to her education; she received lessons and advice from two of the most celebrated literary men of her time, Chapelain and Ménage, who taught her Latin, Spanish, and Italian. As soon as

she appeared in society, she was greatly admired and eagerly sought for on account of her beauty, wit, and wealth. In 1644 she married the marquis Henri de Sévigné, a nobleman of Brittany and a relation of the Retz family, who in 1645 was appointed governor of Fougères. He was a dissipated man, and often neglected his wife, although she loved him, and he had himself great respect for her character. They generally lived either at their seat, Les Rochers, near Vitré, Brittany, or in Paris. Owing to her husband's family relations, she was involved in the civil troubles of the Fronde, and became acquainted with the duchesses of Longueville and Chevreuse. Her husband having been killed in a duel in 1651, she was left with the care of two children, a son born in 1647, and a daughter in 1648, to whose education she devoted herself in the most exemplary manner. The son, who inherited many of his father's faults, became, after a youth of folly, an estimable man; and the daughter was universally admired for her good sense, propriety, and polished address. The beautiful widow herself was surrounded by the homage of many distinguished personages, the prince of Conti, Marshal Turenne, the count of Bussy (her own cousin), and the superintendent Fouquet. In 1663 she presented her daughter at court, and in 1669 married her to the marquis de Grignan, of whom she was the 3d wife. Mme. de Sévigné's letters to her daughter, in which, while expressing her sentiments in the most varied and touching manner, she gives graphic accounts of passing events, have a traditional reputation for vivacity, delicacy, and wit. They were extensively circulated among the friends of the writer, but never intended for the public eye, and it was not until 30 years after her death that they were printed. In 1694 she took up her residence with her daughter at the chateau de Grignan. Her *Lettres* were first collected in 1726. The most complete editions are those of Grouvelle (8 vols. 8vo., Paris, 1806), Montmerqué (11 vols. 8vo., 1818), and Gault de St. Germain (12 vols. 8vo., 1823-'4). An English translation was published in London (1758), from which a selection has been edited by Mrs. S. J. Hale (12mo., New York, 1856).—See Walckenaer, *Mémoires touchant la vie et les écrits de Mme. de Sévigné* (5 vols. 12mo., Paris, 1852).

SEVILLE (Sp. *Sevilla*), a province of Spain, in Andalusia, bounded N. by Badajoz, E. by Cordova, S. by Malaga and Cadiz, and W. by Huelva; area, 4,620 sq. m.; pop. in 1857, 463,486. The surface consists principally of fertile plains, but in the N. the Sierra Morena and in the S. the Sierra Ronda have peaks of considerable height. The Guadalquivir flows through the province in a tortuous but generally S. W. course, receiving numerous tributaries, the chief of which are the Jenil on the E. boundary, the Viar, and the Huelva. The climate is very warm in summer, and frost and snow are almost unknown in winter. Marble, limestone, coal, silver, cop-

per, lead, and iron are found. The soil is remarkably fertile. Horses are numerous, and large numbers of horned cattle, sheep, goats, and swine are reared.—SEVILLE (anc. *Hispalis*), the capital, is situated on the left bank of the Guadalquivir, 62 m. N. N. E. from Cadiz, and 242 S. W. from Madrid; pop. in 1857, 152,000. The city and suburbs are about 10 m. in circumference, but the city proper is only about 5 m. It is surrounded by Moorish walls, with 66 towers, and is entered by 15 gates. Many of the streets are narrow and crooked, but improvements are gradually being made. The cathedral of Seville is one of the largest and finest in Spain. It occupies the site upon which the temples of Astarte and Salambo and a Mohammedan mosque have successively stood. The mosque was pulled down in 1480, and the cathedral completed in 1519. It is 431 feet long, 315 broad, 145 high at the nave, 171 at the dome, and an ancient tower and belfry surmounted by a bronze image rises to the height of 350 feet. Many eminent sculptors have assisted to adorn both the inside and outside of this edifice, and the painted windows, mostly done in the 16th century by foreign artists, are among the finest in Spain. Fernando, the son of Columbus, is buried at the W. end of the central aisle; and the tomb of Ferdinand III., who took the city from the Moors, is behind the high altar. Although this cathedral has frequently been despoiled, it still contains many fine pictures by Murillo and other great painters. It has one of the largest organs in the world. The Alcazar, or royal palace, is a splendid building, not inferior in some parts to the Alhambra. It has some of the columns which were used in the old Roman palace that occupied its site. The university has many fine pictures and sculptures, museums of chemistry, physics, mineralogy, and zoology, and a botanic garden. It was founded in 1502, and removed in 1767 to a Jesuit convent after that order was expelled. It is attended by about 1,000 students. The library has 66,000 volumes. The exchange is a fine building in the classical style; and the other edifices most worthy of notice are the archiepiscopal palace, the corporation house, the town hall, court house, a palace said to be built after the model of Pilate's house at Jerusalem, and the ancient mint. Seville has many hospitals, asylums, and charitable institutions, 123 private schools, several colleges for girls, academies of mathematics, commerce, medicine, surgery, the fine arts, legislation, and jurisprudence, a nautical college, and two theatres. The "tower of gold," said to have been erected by the Romans, is so called from its having been made the place of deposit for the treasures of America. The Guadalquivir is crossed by two bridges; and there is a small quay, and a dockyard where the first Spanish steamboat was built. The manufacture of tobacco is extensively carried on outside the walls, and 4,000 people are employed in making cigars alone. There is a foundry of bronze

and brass ordnance of superior quality, and muskets, saltpetre, and powder are also made. Machinery, earthenware, crystal, silk and linen goods, hats, soap, and leather are all manufactured, but the qualities are inferior. The commerce of Seville has declined greatly since it lost the monopoly of the Spanish-American trade. The principal exports are wool, oil, leather, silk, oranges, quicksilver, copper, and lead; and the imports are hardware, iron, cloth, timber, butter, and cheese. The value of the exports in 1856 was \$3,083,070, and of the imports \$2,794,468. In the same year 262 vessels of an aggregate of 30,164 tons entered the port.—Seville was captured by Julius Cæsar in 45 B. C. He made it a Roman colony, patronizing it in opposition to Cordova, which had espoused the cause of Pompey. When the Goths invaded the country they made it their seat of power, but in the 6th century the court was removed to Toledo. It was in the hands of the Moors from 711 till 1248, when Ferdinand III. of Castile and Leon took it after a long siege, and made it the capital of those united kingdoms, which it remained until the reign of Charles V. A treaty was concluded at Seville in 1729 between Spain, France, and England. The city surrendered to the French under Soult in 1810, when the inhabitants were cruelly treated, the plunder and money extorted from them being estimated at \$80,000,000. After Wellington gained the battle of Salamanca it was evacuated by the French in Aug. 1818, when the English entered the town. It was besieged by Espartero in July, 1843.

SÈVRES, a town of France, in the department of Seine-et-Oise, situated on the left bank of the Seine, 6 m. S. W. from Paris; pop. in 1856, 5,607. It stands in a valley between the hills of Meudon and St. Cloud, and the main street is of great length, being traversed by the Versailles road. The town is chiefly remarkable for the manufacture of the porcelain to which it gives a name. The manufacture is carried on by the government. It was removed from Vincennes in 1755 under Louis XV., when the large building which contains the works was purchased, and in which is a museum with specimens of the porcelain of all ages and countries. There are also manufactories of shawls, cordage, leather, and chemical substances, and various chemical arts are carried on. Sèvres is a very ancient place, and is supposed to have been in early times a residence of the French kings.

SÈVRES, Deux, a W. department of France, in the old provinces of Poitou and Angoumois, bounded N. by Maine-et-Loire, E. by Vienne, S. by Charente and Charente-Inférieure, and W. by Vendée; area, 2,341 sq. m.; pop. in 1856, 327,846. A chain of hills which have a mean height of 450 feet traverses the department in a S. E. and N. W. direction, dividing it into two distinct portions. The principal rivers are the Sèvre-Niortaise and Sèvre-Nantaise, which give the department its name, the

Mignon, Thouet, Argenton, Dive, and Antise. The department is traversed by 7 canals. Iron, rock crystals, and saltpetre are found. The vineyards in the S. W. part of the department produce good brandy and white wines. There are manufactories of woollen, linen, and cotton goods, leather, earthenware, brandy, cutlery, and paper. Capital, Niort.

SEWARD, ANNA, an English authoress, born in Eyam, Derbyshire, in 1747, died in Lichfield in March, 1809. She early evinced a taste for poetry, and at 9 years of age could repeat the first 3 books of "Paradise Lost." At Lichfield, where the greater part of her life was passed, she became intimate with Darwin, of whom in 1804 she published a memoir, in which she lays claim to the first 50 lines of his "Botanical Garden." Her poetical works consist of a metrical novel entitled "Louisa" (1782), which was once very popular, and a collection of "Sonnets" published in 1799. Her best pieces are her elegies on Captain Cook and Major André, which, from the popular character of the subjects, had great celebrity. She was contemporary with the Della Cruscan school of poetry, and in the affected language of the day was called the "swan of Lichfield." She bequeathed a mass of manuscript poetry and correspondence to Sir Walter Scott, which he edited in 1810 with a memoir of the authoress. Constable also published 6 volumes of her correspondence.

SEWARD, WILLIAM HENRY, an American statesman, born in Florida, Orange co., N. Y., May 16, 1801. His ancestors were of Welsh extraction on his father's side and of Irish on his mother's. His father, Samuel S. Seward, who died in 1849, was a physician, and combined with his profession a large mercantile business, by which he amassed a fortune. For 17 years he held the office of first judge of the county. William Henry when 9 years old was sent to an academy at Goshen, among whose pupils had been Noah Webster and Aaron Burr. At 15 he went to Union college qualified for the junior class, though he entered the sophomore. In 1819, while in the senior class, he spent 6 months as a teacher in Georgia, where he received impressions strongly unfavorable to slavery. After taking his degree he became a student at law, and was admitted to the bar in 1822. He removed to Auburn the next year, forming a law partnership with Judge Miller, whose youngest daughter, Frances Adeline, he married in 1824. His first public political act was in 1824, when he prepared an address for a republican convention, boldly announcing an opposition to the "Albany regency," as the leaders of the democratic party of New York were then styled, which was continued until crowned with success in 1838. On July 4, 1825, in an oration at Syracuse, he defended the cause of liberty, occupying very similar grounds to those he assumed at more recent periods. In Aug. 1828, he was chosen president of a young men's convention, one of

the largest ever held in New York, called to favor the reelection of John Quincy Adams to the presidency. On his return home from the convention he was tendered a nomination as member of congress, which he declined. Two years later he was elected to the state senate as an anti-mason by a majority of 2,000, although the district had given a large adverse majority the preceding year. Among the measures which he advocated in the senate of New York were those relating to internal improvements, education, the reform of the militia system, the abolition of imprisonment for debt, and the improvement and melioration of prison discipline. He originated an opposition to corporate monopolies which has since ripened into a system of general laws. In 1833 he visited Europe, and made a rapid tour of Great Britain and a portion of the continent, publishing the result of his observations in a series of letters which appeared in the Albany "Evening Journal."—In 1834 he was nominated for governor by the whig party, but was defeated in the election by W. L. Marcy, although in every county he led his ticket. In 1836 he became the agent of the Holland land company. In 1838 he was again nominated for governor by the whigs, and in a hotly contested election was successful by a majority of 10,000 over his former competitor, Gov. Marcy. He entered upon his duties in 1839 amid unusual difficulties. His party were in power for the first time, and a flood of financial troubles was sweeping over the state and country, greatly embarrassing and complicating all political relations. Among the measures to which he early directed his attention were the extension of public education, the vigorous prosecution of the public works, including the enlargement of the Erie canal, and the removal of the legal disabilities imposed on foreigners. Perhaps the most prominent feature of his administration was his effort to secure the diffusion of common school education among children of every class, especially those in large cities and of foreign parentage, advocating an equal distribution of the public funds among all schools established with that object. His policy, at the time vehemently condemned, was in 1847 substantially adopted, and enacted as a law. The courts of law and of chancery in New York, organized on the model of the English system, were marked in their practice by all the prolixity, technicalities, and expensiveness of the English courts. Amid much opposition Gov. Seward exerted all his influence in favor of a reform, preparing the way for the radical changes effected in the constitution of 1846. The geological survey of the state, the perfection of the general banking system, and the establishment of a lunatic asylum were also measures of his administration. Imprisonment for debt was entirely abolished, the formidable anti-rent rebellion was subdued so that the laws were duly executed, and every vestige of slavery was cleared from the statute books,

while he was governor. A controversy sprung up between Gov. Seward and the executive of Virginia in relation to slavery and the rendition of fugitives from justice. The case arose on the application of the governor of Virginia for the return of two seamen charged with abducting slaves. In the correspondence between the parties, Gov. Seward maintained that no state could force a requisition upon another state founded on an act which was only criminal by its own legislation, and which, compared with general standards, was not only innocent, but humane and praiseworthy. The correspondence, known as "the Virginia controversy," was widely published. Mr. Seward held the office of governor for two terms, having been reelected in 1840. He early announced his intention not to be a candidate for a third term. On retiring from office he again resumed the practice of law, first in the courts of his own state, and afterward acquiring a lucrative share of patent causes in the courts of the United States. At the same time his generous disposition often led him to appear in criminal cases where persons were, as he thought, unjustly accused. In these cases he not only gave his best efforts gratuitously, but sometimes furnished the pecuniary means, in large sums, for a proper defence. His arguments in the case of Van Zandt, charged with harboring fugitive slaves in Ohio, of Freeman, charged with murder, and of 50 citizens of Michigan indicted for conspiracy, hold a high rank in the records of criminal trials.—In 1844 Mr. Seward entered with energy into the presidential contest in behalf of Henry Clay, and again in 1848 in support of Gen. Taylor. With the election of Gen. Taylor a large majority of Mr. Seward's friends were returned to the legislature of New York, who early selected him as their candidate for U. S. senator, in place of Gen. Dix, whose term was about to expire. In the election (Feb. 1849) Mr. Seward received 121 votes to 80 for all others. On the meeting of congress in December following, the members from the South, apprehending the adoption of an anti-slavery policy, took grounds in opposition to Gen. Taylor's administration, while the friends of freedom sustained it. Gen. Taylor early chose Mr. Seward as one of his confidential friends and advisers, and he soon came to be regarded as the leader of the administration party. A violent contest in congress immediately commenced. Mr. Seward avowed a determination to make no further concessions to the slave power, and was denounced as a seditious and dangerous agitator. In a speech on the admission of California into the Union, March 11, 1850, he used the following language: "It is true, indeed, that the national domain is ours. It is true, it was acquired by the valor and with the wealth of the whole nation. But we hold, nevertheless, no arbitrary power over it. We hold no arbitrary authority over any thing, whether acquired lawfully or seized by

usurpation. The constitution regulates our stewardship; the constitution devotes the domain to union, to justice, to defence, to welfare, and to liberty. But there is a higher law than the constitution which regulates our authority over the domain, and devotes it to the same noble purposes. The territory is a part, no inconsiderable part, of the common heritage of mankind, bestowed upon them by the Creator of the universe. We are his stewards, and must so discharge our trust as to secure in the highest attainable degree their happiness." The phrase "higher law," thus applied to the law of God, was the subject of much excited comment in the senate and in the public press, and has been ever since urged as a ground of reproach by the political enemies of Mr. Seward. Beside his speeches on the compromises of 1850, he delivered others equally elaborate on the commercial and industrial relations of the country—upon the Pacific railroad, the public lands, mail steamers, American fisheries, survey of the Arctic and Pacific oceans, French spoliations, the tariff, the ocean telegraph, &c. His speeches on the repeal of the Missouri compromise and the admission of Kansas, like those on the compromises of 1850, were widely circulated among the people. The right of petition, the assault on Senator Sumner, the Dred Scott decision, the acquisition of Cuba, the increase of the army, and the Utah or Mormon difficulties, were also subjects fully discussed by Mr. Seward in the senate. During the recess of the senate in 1858 he made an election speech at Rochester, in which, after alluding to the constant collision between the systems of free and slave labor in the United States, he said: "Shall I tell you what this collision means? They who think that it is accidental, unnecessary, the work of interested or fanatical agitators, and therefore ephemeral, mistake the case altogether. It is an irrepressible conflict between opposing and enduring forces, and it means that the United States must and will, sooner or later, become either entirely a slaveholding nation, or entirely a free labor nation." The great southern secession plainly revealing itself during the last session of the 36th congress (1860-'61), Mr. Seward in the senate expressed his views on "the state of the Union" in two speeches, in which he said: "I avow my adherence to the Union with my friends, with my party, with my state, or without either, as they may determine; in every event of peace or of war, with every consequence of honor or dishonor, of life or of death." He declared also in conclusion: "I certainly shall never directly or indirectly give my vote to establish or sanction slavery in the common territories of the United States, or anywhere else in the world." Mr. Seward's second term closed with the 36th congress, March 3, 1861. He had been reelected in 1855 under circumstances of peculiar interest. He was strenuously opposed both by those who disliked his uncompromising resistance to the slave interest,

and by those who could not endure his persistent opposition to the exclusive creed of the "American" party, at that time a rising power throughout the Union.—The whig party, to which Mr. Seward had belonged since its organization, in 1852 adopted a platform approving of the slavery compromises of 1850, at the same time nominating Gen. Scott for the presidency. While Mr. Seward could not sustain the platform, he yielded his support to the nominee, who before the convention had been regarded already as his favorite candidate. In 1856 the republican party nominated Col. Fremont for the presidency. Mr. Seward's labors in the canvass were zealous and effective. In 1860, as in 1856, a large portion of the republican party favored his nomination for the presidency. In the convention, on the first ballot, he received 173 votes, Mr. Lincoln, the next highest, 108—necessary for a choice, 238. On the final ballot Mr. Lincoln was nominated. Mr. Seward received the votes of the delegates from Maine, Massachusetts, New York, Michigan, Wisconsin, Minnesota, California, and Kansas. He promptly supported the nomination of Mr. Lincoln, and during the canvass made a tour through the western states, in nearly all of which he delivered speeches, and was everywhere received in an enthusiastic manner. The election resulted in the success of the republican party. Soon after the meeting of the electoral colleges Mr. Lincoln tendered the chief place in his cabinet to Mr. Seward, and on March 4, 1861, he entered upon the duties of secretary of state, which he is now discharging.—In 1859 Mr. Seward made a second visit to Europe, and extended his travels to Egypt and the Holy Land. His studies have not been exclusively those of a statesman, politician, or lawyer. His published works bear ample testimony to his general scholarship and literary attainments. We can here only refer to his orations on John Quincy Adams, O'Connell, and Lafayette; his addresses at the dedication of the university at Columbus, Ohio, before the American institute in New York, to the Phi Beta Kappa society of Yale college, and on forefathers' day at Plymouth; and other occasional speeches on agriculture, education, and internal improvements. He has also contributed a historical essay, entitled "Notes on New York," to the great work on the natural history of the state, to which it forms the introduction. After the decease of Henry Clay and Daniel Webster, Mr. Seward, in the senate, delivered a tribute to the memory of each of those illustrious statesmen; and of these and of the funereal eulogiums more recently pronounced by him on Senators Clayton, Rusk, and Broderick, it has been said that our language affords few better specimens of mortuary eloquence. In 1849 he prepared a life of John Quincy Adams in a popular form, which had an immense sale. He has also written a biography of De Witt Clinton, an abstract of which he prepared for this cyclopædia. "The Works of William



H. Seward" (4 vols. 8vo., New York, 1853-'61) include his orations and addresses, senatorial, occasional, and political speeches, messages and official correspondence while governor, his forensic arguments, and miscellaneous writings, with a biographical memoir and historical notes.

SEWELLEL, a North American rodent of the genus *aplodontia* (Rich.), so called from the simple structure of the molars, apparently connecting the beaver with the squirrels through the spermophiles. It resembles the prairie dogs in the hairy and obtuse nose, fore feet with 5 claws, distinct ears, very short tail, and the flattened outline of the skull; but the rootless molars and the absence of post-orbital process bring it near the beaver. The fore claws are much larger than the hind ones, even the short thumb having one; the soles and heels naked; the mouth is rather small, the lips thick, and cheek pouches absent; the incisors are strong, flat, without grooves, and yellow, and the molars  $\frac{1}{2}$ - $\frac{3}{4}$ , prismatic, the anterior very small; the bony orbits very large, and the cranial cavity small; the descending branch of the lower jaw is twisted so as to be horizontal behind, and its lower angles are extended inward as far as the molars, the whole jaw being very strong. The only described species of the genus is the *A. leporina* (Rich.), about the size of a muskrat, with a short, thick, and heavy body; the color is reddish brown, grayish plumbeous below; the eyes are very small, the whiskers long and stiff, the ears rounded and covered with hair, and the tail much flattened; the fur is dense and soft, with longer bristly dark hairs interspersed; the limbs are short and robust; mammae 6, the anterior 2 between the fore legs; the length is 16 inches, of which the head is  $3\frac{1}{2}$  and the tail  $1\frac{1}{2}$  inches. It is found on the N. W. coast, in Washington and Oregon territories, and in California, in timber lands near the coast; it has not been found east of the Rocky mountains; it is called show't'l in many places. They form small societies, living in burrows, and feeding on vegetables; the natives make robes of the skins. It was discovered by Lewis and Clark.

SEWER, a drain constructed under the streets of towns for carrying off the surface waters and the liquid refuse matters from houses. The necessity of underground channels of this character to the comfort and health of thickly populated places was well understood by the ancient Romans, who at a very early period adopted a regular system of drainage of this character in their famous sewers, of which some account is given under OROSCÆ. These included not merely the spacious subterranean vaults by which the drainage of the pestilential marshes about the city was effected, but also the wooden pipes, clay tubes, or drains of whatever kind by which the impurities were conveyed from the houses into the main conduits. So completely was the city underlaid by these passages, that it was

designated by Pliny as *urbs pensilis*, a city supported upon arches.—The great sewer surrounding Paris, draining the valley of the Marais, Menilmontant, and Montmartre, and known as the *égout de ceinture* of Paris, was built in 1412; and from that time the central government has exercised through the department of public works an active control over the system of sewerage. In England the subject was generally left to local commissions, and in some of the cities to municipal corporations empowered by special acts of parliament. The drainage of London was provided for by legislative enactments commencing in 1225, and the whole subject was thoroughly revised by Sir Thomas More in the celebrated "bill of sewers," passed in 1581. The use of the sewers of London, even up to the present century, was limited to the removal of the waters that ran in the gutters of the streets, including those thrown out from the houses; and in the reign of George III. an act was passed prohibiting the discharge of other matters into them under penalty of a fine. Every house was provided with a cesspool, and this was occasionally discharged by the night carts which conveyed away the offensive matters. Upon the gravelly soil to which the city was then limited this answered very well; but the extension of the city over the more impervious clay beds, and the introduction of abundant supplies of water into every house, followed by the invention of water closets, led to a new use of the sewers, to a taxing of their capacity, and to various results not at all contemplated in their original construction. The refuse matters of the cesspools, instead of being transported into the country to serve as manure, were turned into the river Thames, polluting its waters, while the sewers themselves in the lower parts of the city were incompetent to discharge the increased burdens, and the ventilating flues through the streets became avenues of the most poisonous gases. A reconstruction of many of the sewers upon a larger scale became necessary, and they were laid out upon a regular system, coming down to the river from each side for a distance of 6 miles along its course. Their total length exceeded 2,000 miles, and when they were completed London was regarded in 1855 as one of the best drained cities in the world. The principal sewers were of extraordinary dimensions. Those on each side of Farringdon street, known as the Fleet ditch, and originally as the Fleet river, are from 12 to 14 feet high and 6½ feet wide. The Moorfields sewer is 8½ by 7 feet, and at the mouth 10 by 8 feet; at the N. end of the Pavement it is 27 feet below the surface. The more ordinary dimensions, however, were of the largest sized stoneware pipes of semi-circular section upon a diameter of 2 feet; and in brick work in egg shape, height 3 feet 3 inches, width 2 feet; and height 4 feet, width 2½ feet; and also 4 feet 9 inches by 3 feet, and 5½ by 3½ feet. Notwithstanding the great

scale of this drainage system, the most serious difficulties have been experienced in its operation. The outlets of the sewers, in order to get sufficient fall for discharge, are but little above low water mark, the surface of some portions of the city itself being below high water mark. Consequently the sewers are closed by the tide except at low water, and the gaseous contents of the sewage are turned back into the city and up the drains into every street and house. The discharge moreover taking place only about the time of lowest water, the accumulated contents of the sewers are kept up the river until the ebb, washed about in front of the city, and when at last carried down the stream they are almost immediately replaced by the same amount of fresh filth. The testimony of medical and scientific authorities upon the effect of this accumulation upon the river water and the atmosphere above, as presented in the parliamentary reports, is singularly conflicting. According to some, both the water and air are contaminated in the warm weather to the most offensive degree; while others assert that the foul materials, distributed as they are at so many points along the river, are deprived of their noxious qualities by the enormous dilution and chemical effect of the water, and that the hospital ships kept upon the surface of the river indicate in their medical reports no injurious consequences to the health of their occupants. All agree, however, that foul banks of black mud, from which the most offensive odors emanated when they were laid bare at low tide, collected along the banks and in the shallow parts of the river; and in 1858 it was judged indispensable to adopt some active measures for the abatement of the nuisance. It was then decided to attempt to disinfect the sewage by discharging every day during the warm weather immense quantities of lime and chloride of lime into the river. The quantities of these thus thrown in in the summer of 1859 amounted to 110 tons of lime and 12 tons of the chloride every day, at a weekly cost of about £1,500; and in that season £20,000 more were also expended in flushing the sewers in order to aid in expelling their contents at extreme low water. Plans were also sought for from scientific and practical men by which the serious difficulties encountered might be permanently overcome; and at last one submitted by Mr. Bazalgette, chief engineer of the board of works, was adopted, and is now in process of execution. It consists of 3 gigantic main tunnels at different levels and distances back from the river, intercepting the present sewers at right angles. Receiving their contents, which were formerly emptied directly into the river, they will convey them along the course of the river about 8 miles to Barking, into a reservoir a mile and a half long, and about 100 feet wide by 21 feet deep. This is to be covered over with arched brick work and earth to prevent the escape of foul gases, and the sewage being to some ex-

tent deodorized by the introduction of suitable materials, at high tide it will be discharged through numerous large pipes into the middle and bottom of the river at the depth of 60 feet below the surface. The estimated cost of this vast work is about £4,000,000, and the time for its completion 5 years. The sewers are constructed in brick work, and where they unite together, the immense main tunnel is supported by huge buttresses, beside being contained in what may almost be called an embankment of concrete.—An important change has been recently introduced in the sewerage of cities by the general substitution of small earthenware pipes for the large brick sewers. The latter, by admitting the accumulation of sewage matters and by their permeability to the gases generated by these, were the cause after a time of the earth beneath the streets becoming contaminated, and the leakage of the gas mains added to the evil. The pipe sewers are too small to admit the retention of the sewage, and it is therefore swept through so rapidly that no great amount of foul gas can be produced by its decomposition. The clay pipe is moreover tighter in service than the brick work, there being no mortar joints to become loose, and less opportunity being thus afforded for the mining of rats, which do much mischief to the brick sewers.—In any system in use the ventilation is very imperfectly provided for; and the need of this is seriously felt in some of the large cities of England. The effluvium from the ventilating holes in the pavement is very perceptible, and its effect is so decided that the butchers are obliged to avoid their vicinity, their meats soon becoming tainted in the foul atmosphere. Connections have consequently been made where allowed with chimney flues of houses and of manufacturing establishments; and it is thought probable that it will ultimately be advisable to erect chimney stacks in suitable positions for this sole purpose. The relative efficiency of the various deodorizers was carefully investigated, and in 1858 the commissioners of the London sewers reported that wood charcoal placed in a box in the draught of the offensive gases had the property of completely arresting the foul odor, and that this property did not appear to diminish by long use. The comparative cost of different disinfectants to purify a given amount of sewage of uniform quality had been before thus presented in a report to the British secretary of war:

Boghead charcoal (coke), 1 ton .....	\$3 00
Nitric acid.....	8 50
Black oxide of manganese.....	9 25
Chloride of lime.....	10 75
Peat charcoal.....	11 00
Animal charcoal.....	16 75
Bichloride of mercury.....	18 00
Impure chloride of zinc in damp powders.....	26 00
Chloride of zinc in solution, Sir Wm. Burnett's.....	37 00
Sulphate of copper.....	89 00

Other sulphates, as well as a number of other substances sometimes employed as disinfectants, proved ineffectual even in very large quantities to entirely deodorize the sewage; but arsenious

acid and creosote possessed this property in a high degree.—The cities of the United States are in general more favorably situated than London as regards the facilities for the removal of sewage matters. Efficient sewer systems have in general been seasonably established after the introduction of fresh water by aqueducts, and have kept pace with the increasing areas requiring their extension. As in European cities, the main sewers are constructed of brick work and the smaller ones of earthenware pipes, each length having a larger and smaller end for convenience in fitting them together. They are laid along the middle of the streets at variable depths in conformity with the required grades of the system adopted for each city, and which is itself dependent upon the contour of the surface. The cost of the sewers is assessed upon the house lots along their line, and from each one of these a drain may be laid discharging into the street sewer. At many of the corners of the streets catchpools are built in brick work, which, covered by an open grating, admit the wash of the streets to flow in, and retain in the bottom the mud and sand while the water flows by a side passage into the sewer. Occasionally the sediments are removed by raising them to the surface and carting them away for manure; and the main sewers themselves, if need be, are at times cleaned out by flushing or by men who pass through them for the purpose. The ventilation is through these grates and frequent shafts up to the pavement covered with perforated iron plates. Charleston, S. C., which would seem from its level surface and low position, but little above the level of high tide, to be very unfavorably situated for a system of sewers, is in fact one of the best provided for in this respect of American cities. The sewers are in general completely washed through at every return of the tide, and the flow is found to be sufficient to keep them in good order.—Notwithstanding the immense amount of valuable fertilizing matters contained in the sewage of cities, it has rarely been found economical to attempt to save them, chiefly on account of the much greater bulk of fluids with which they are mixed, and from which the more solid portions cannot be conveniently separated without interfering with the great object of the sewers as now constructed. It is also asserted in some of the chemical reports presented to the British parliament that the solid portion of the sewage, by the decomposition it soon experiences, is deprived of its fertilizing qualities to such extent as not to be worth saving. With the very partial escape of the ammoniacal and other volatile portions that produce the effluvia, it is certain that some of the active properties of the sewage is lost; but there must remain behind the fixed elements and salts that enter into the composition of organic bodies, and in these residues they must exist in a very favorable state to be taken up by the growing plants, as in guano itself. This statement is the more

remarkable, as it is well known that this manure is more highly prized on the continent than any other. It is there generally known as the "Flemish manure," and is most carefully preserved for sale. In Brussels, Strasbourg, and other cities, contractors purchase the right of emptying the cesspools once a year. In Strasbourg the products of the sale are estimated at 4½ francs per annum for each inhabitant. (See Cuthbert W. Johnson "On the Fertilizers," London, 1851.) It is an unquestionable fact that through the sewage of cities enormous amounts of the constituents of plants are conveyed into the sea and lost, and that unless saved and restored to the soil, the loss must be made up from other sources or the lands become impoverished. Upon the meadows a mile and a half S. E. of Edinburgh, the success attending the application of the sewage waters by irrigation has been most extraordinary, 4 crops of grass being obtained from April to November, the aggregate weight of which in the green state has been equal to 80 tons to the acre. The lettings of these meadows average over £20 the acre, the highest in 1850 being £31 for the season. The sewage from the town is conducted through contour channels following the inequalities of the ground, and is run by small branches through every half acre. Upon portions above the natural drainage the sewage is raised by steam pumps. The irrigation is continued through the winter. Other instances are recorded of the wonderful effects of the liquid sewage in reclaiming to as remarkable production sandy wastes of no previous value whatever. Sewage has also, been advantageously deodorized and applied to agricultural uses in localities in England where it could not be conveniently discharged into the sea, by the process of Mr. W. Higgs of Westminster, which consists in collecting it in large tanks and admitting with it a stream of lime water, the effect of which is to cause the precipitation of the organic matter with the phosphates, urates, sulphates, &c., and the expulsion of any free ammonia. Through the cover of the tanks the ammonia and all gaseous matters are conveyed by a pipe into a convoluted chamber, where they are fixed by various chemical reagents and preserved. The tanks when full are allowed to remain undisturbed for an hour, when the liquids are drawn off clear and without odor. The pulpy sediments are then collected and dried and rendered fit for the market. The expense of the process was rated at £1 per ton, and the manure thus prepared sold at Cardiff for £3 per ton. Clay in lumps has been burned like lime in heaps and kilns upon a large scale in some parts of England to be used as an absorbent of sewage matters, for which its capacity is very great. For absorbing and deodorizing the gaseous portions charcoal and gypsum are both very efficient, and when thus charged may be advantageously applied to agricultural purposes.

Peat, charcoal especially has been found of great value for this application.

**SEWING MACHINE**, a mechanical contrivance for reducing the labor of hand sewing. The first attempts of the kind, as was natural, were rather close imitations of the operations peculiar to hand sewing, though they also introduced features essential to the most improved sewing machines. Thus the ancient tambouring apparatus, employed for embroidering figures upon fabrics, to be afterward removed and sewed upon others, combined the eye-pointed needle with other devices now common in sewing machines. The earliest patent of this character appears to be that granted in England, June 24, 1755, to Charles F. Weisenthal, and covered the needle with the eye in the centre and pointed at both ends, adapted for passing each way through the cloth without being turned round. It was for hand embroidery, and is of interest only as introducing this kind of needle, afterward employed in sewing. The next improvement of interest was that patented by Robert Alsop in England, March 22, 1770, for embroidering in a loom with one, two, or more shuttles. Machine embroidering with a large number of needles appears to have been invented about the beginning of the present century by John Duncan, who patented the process, May 30, 1804. He used barbed or hooked needles attached in a straight line to a horizontal bar, the forward motion of which carried the barbed ends all through the fabric together; and each being then supplied with thread by a feeding needle, the reverse motion took them all back with the loops of thread, which passed through and secured the loops of the previous stitch. Patterns were worked by a sliding motion of the fabric with its vertical frame either to the right or left, up or down, the movement being produced either by screw spindles worked by hand or by pattern cams cut to the required design. This may be considered the first important step made in embroidering machinery, which was afterward carried to great perfection in the machines of M. Heilmann. (See **EMBROIDERY**.) The invention of James Winter, patented in England, Feb. 20, 1807, of an apparatus for facilitating the stitching of leather gloves, in which the pieces to be united are held together by jaws of metal, may be regarded as a step toward the present system of sewing machines, inasmuch as it provided a substitute for the finger and thumb of the seamstress in holding the fabric. The sewing however was done by hand, the places for the needle being indicated by the interstices between the teeth of a sort of comb, as described in the article **GLOVE**. In 1834 a foreign patent was granted to M. Thimonnier for a crocheting machine adapted to sewing purposes. A hooked needle was used, and the point thrust through the cloth caught the thread and brought back with it a loop. Retaining this loop, the point was passed through the cloth again a little in advance, and catching

another loop through the first one, the second was drawn up leaving the first secured by it, and so on. The machine attracted little attention, though in 1848 it was the subject of some patented improvements of M. Magnin, who was then associated with M. Thimonnier, and in 1851 it appeared in the great exhibition in London. Some other of the essential features of modern sewing machines were introduced to public attention in the patent granted to Newton and Archbold, May 14, 1841, for their method of producing ornamental or tambour work in stitching the backs of gloves. The thread, in its course from the reel or bobbin to the needle, was passed over a roller covered with cloth for the purpose of giving a proper drag or tension, and the slack was prevented by the rising and falling of a bar against the thread keeping it uniformly stretched as the needles alternately drew upon and loosened it. The material was held between metal clamps, and with these was moved forward stitch by stitch by a rack and pinion motion. Through the clamps were openings for the passage of the sewing instruments. A machine for making the through and through or shoemaker's stitch was patented Feb. 21, 1842, by J. J. Greenough of Washington. The needle was pointed at both ends with the eye in the centre, and was drawn through one way and then the other by a pair of pincers. A machine for making the running or basting stitch was patented March 4, 1843, by B. W. Bean of New York. The fabric, passed between corrugated wheels, was thus crimped, and the stitches were made by pushing a long needle through the folds. An apparatus made on this principle was largely introduced into England, and used by bleachers, printers, dyers, &c., for temporarily basting pieces of stuff together. The mention of a needle in combination with a shuttle for interlocking two threads so as to produce a stitch, first appears in the English patent of John Fisher and James Gibbons of Dec. 7, 1844. The machine contained several sets of needles and shuttles working simultaneously, and was intended for the purpose of ornamentation, but was not used even for this.—The first complete sewing machine designed for general purposes was patented Sept. 10, 1846, by Elias Howe, jr., of Cambridge, Mass. He used a needle and a shuttle of novel construction, and combined them with holding surfaces, feed mechanism, and other devices, as they had never before been brought together in one machine. They were all indeed combined anew by Mr. Howe, who was unacquainted with what had been done by others, and his machine, though not patented till 1846, was really invented several years before the patent last described. One of the principal features of Mr. Howe's invention is the combination of a grooved needle, having an eye near its point and vibrating in the direction of its length, with a side-pointed shuttle for effecting a locked stitch and

forming with the threads, one on each side the cloth, a firm and lasting seam not easily ripped. The main action of the machine consists in the interlocking of the loop made by the thread carried in the point of the needle through the cloth, with another thread passed through this loop by means of a shuttle entering and leaving it at every stitch. The thread attached to this shuttle remains in the loop and secures the stitch, as the needle is withdrawn to be ready to make the next one. At the same time the cloth, held by little projecting pins to the baster plate, is carried along with this by what is called the "feed motion" just the length of a stitch, the distance being readily adjusted for finer or coarser work. This part of the apparatus is the same in principle with the feed motion long familiar in the saw mill carriage and other machines designed to effect a similar object. The cloth is held in a vertical position in the machine, and the part to be sewed is pressed against the side of the shuttle race by a presser plate hinged on its upper edge and capable of exerting any required pressure on the cloth according as the adjusting screw that regulates it is turned. A slot or perforation through the plate, also extended through the side of the shuttle race near the bottom, admits the passage of the needle, and when this is pushed in the shuttle can still pass freely over it. The shuttle is pushed one way and then the other through its race or trough by picker staves. The thread for the needle is supplied by a bobbin, the movement of which is checked by a friction band, this securing the proper tension, and the slack of the thread is duly taken up by a suitable contrivance for the purpose. Thus all the essential features of the most approved sewing machines were first found in that of Mr. Howe; and the machines of later date are in fact but modifications of it. In a suit brought before the U. S. circuit court for Massachusetts in 1854, Judge Sprague stated in his opinion: "There is no evidence in the case that leaves a shadow of doubt, that for all the benefit conferred upon the public by the introduction of a sewing machine, the public are indebted to Mr. Howe." The lock stitch he introduced has not been improved, and for the general purposes of sewing nothing further is desired. It is formed with the threads one upon each side of the fabric, drawn in a double interlocked loop into the centre of the material, so that the appearance of only a single thread is presented in the regular stitches on each side. The seam is thus perfectly neat, and at the same time firm and elastic, and equal in strength and durability to the fabric sewed. Indeed, the only objection ever made to the stitch is the difficulty of ripping the seams when this is required. It is adapted to the whole range of needle work, from the lightest gossamer to the heaviest harness and upholstery. The consumption of thread is from  $2\frac{1}{2}$  to 3 yards for each yard of seam, the

quantity of course varying slightly with the thickness of the material sewed.—The first principal modifications introduced in the shuttle machine were the substitution of an endless feed for the baster plate, and a vertical for a horizontal movement of the needle, the cloth in this case being placed upon a table and made to pass horizontally under the needle. Attempts also were soon made to reduce the power required to drive the machine, by introducing modifications of the shuttle. In its original form this worked to great disadvantage, making only a single stitch in its complete movement forward and back. To drive it 800 to 1,000 times a minute required considerable power, most of which by a better contrived arrangement ought to be saved. The success already attained gave great stimulus to the efforts of ingenious men, the result of which soon appeared in a multitude of patents, among which were some decided improvements upon the apparatus of Mr. Howe, but still of such a character that they could only be used subject to his original patents. Other inventions afterward appeared that were essentially novel, and yet were dependent upon some part of the patented apparatus of Mr. Howe, the right to use which had to be obtained from him. Still later inventions adopted some of the peculiar contrivances of several of the older machines, to each of which they paid tribute. Thus great numbers of machines have been brought before the public, each claiming some peculiar advantage over the others, and some adapted for special use either for families or manufacturing purposes.—All the machines may be included in three several classes, based on the stitch they make. The first is the single-thread or chain-stitch machines, which many have heretofore regarded as more appropriate for crocheting or embroidering than for fastening seams together. They, however, employ the same appliances of an eye-pointed needle, &c., as the other machines, and are now held in great favor by many persons who use them for the general purposes of sewing. The second class comprises the double-thread lock-stitch machines, and may be subdivided into those using the shuttle and those employing some other contrivance, as the "rotating hook" of Wheeler and Wilson's machine for forming the interlocking stitch. This is by far the most numerous class, and the several varieties that belong to it are directly based on the main principle of Howe's machine. The most important of the first division of this class are the machines of Messrs. Singer and co., A. B. Howe, Finkle and Lyon, and Ladd and Webster. The third class make the double chain stitch with the use of two threads. Grover and Baker's machines belong to this group. Some of the most prominent machines of these classes will be noticed after following again in order the progress of the most noteworthy improvements. The features in Howe's machine which it was most desirable to improve were the shuttle and the

feed; and the first step toward this was made by S. C. Blodgett and J. H. Lerow of Boston, and patented Oct. 2, 1849. Instead of the reciprocating motion, the shuttle was made to describe an entire circuit, thus avoiding the loss of power and the wear consequent on the continual change in the direction of its movement. With each revolution a stitch was completed. The arrangement proved imperfect from the liability of the thread to untwist and entangle. The next improvement was that of Allen B. Wilson of Pittsfield, Mass., patented in 1850, which consisted in a double-pointed shuttle making a stitch at each movement. This, however, soon gave place to the more important improvements of Mr. Wilson made the next year, and to be presently noticed. At this time was brought forward a novel machine invented by F. R. Robinson of Boston, and patented Dec. 10, 1850. It was adapted for making a variety of stitches, as the "back stitch," such as is employed in sewing on collars and ruffs, also the plain running or basting stitch, and with suitable modifications the "cordwainer's stitch." The thread was used in short lengths as in ordinary sewing, and a single piece at a time; but two hooks or needles were employed, one on each side the fabric, the point of each passing alternately through, receiving the thread, and drawing it back. The slow operation, the wear upon the thread, and the frequent threading required were sufficient objections to prevent the machine from coming into use. A single-thread chain-stitch machine was patented Feb. 6, 1849, by Charles Morey and J. B. Johnson of Massachusetts. This was furnished with an eye-pointed needle for penetrating the cloth, and a hooked instrument on the other side, which caught the thread and held the loop open until the fabric was carried forward the length of a stitch, and was again penetrated together with the first formed loop, which was thus secured, when the threads were drawn by the successive movements of the hook and needle. A circular or continuous carrying plate or baster was added to this machine, to which the cloth was suspended, and which constituted the feed. It was an improvement upon the straight baster-plate feed of Mr. Howe. The machine was used to considerable extent in the New England print works and bleach works, and by the bag makers and upholsterers, and sewed at the rate of about a yard a minute. The next inventions of importance were those of Mr. Wilson, referred to above, which, though combining principles patented by Mr. Howe, were, like his first one, really made without any sort of reference to what had been done by others; and this is not the only instance of the kind in the history of the sewing machine, the invention of which was at this period occupying the minds of many persons in different parts of the country. As a complete substitute for the shuttle, Mr. Wilson invented an entirely novel device in machinery, which performs its office with the slightest ex-

penditure of power and the greatest rapidity and accuracy of movement. This instrument is known as the rotating hook, and was patented Aug. 12, 1851. It is a disk of polished steel  $1\frac{1}{4}$  inches in diameter, with a small portion of its periphery cut out and a hooked form given to the two opposite ends. It is attached to the end of the horizontal pulley shaft or mandrel of the machine, with which all the movements are directly connected, and revolves with this. The needle descends with each revolution, and its point passing through the cloth, which is laid on the flat plate above, enters a slot in the periphery of the disk, carrying its thread down with it in such a position that the thread on the outer side of the needle is caught by the rotating hook, and carried along with it about  $\frac{1}{4}$  of its revolution, when the loop slips off the outer side of the disk in consequence of its edge being bevelled, and is partially drawn up by the needle as it rises. The other thread, previously wound by the machine itself upon a steel bobbin no thicker than a half dollar and about the same size, is placed in a concavity on the outer face of the rotating disk, to which the bobbin is just fitted, and in which it is loosely held by an annular plate with a concave face that slides up against the bobbin and is fastened by a thumb screw. As the rotating hook carries the loop round it causes the thread as it slips off to cross this bobbin, and of course catch its thread, the ends of both threads being brought out and held together before starting. The bobbin has no axis by which it is supported, to interfere with the movement of the thread around and on both sides of it, and by reason of its perfectly polished surface, and that of the rotating hook and outer ring between which it is retained, the loop passes with perfect ease, and the bobbin slips round just enough to give its portion of the thread to each stitch. The revolution of the upper edge of the bobbin is toward the front of the machine, and that of the hook is in the opposite direction. The friction thus produced is sufficient to give the required amount of strain or tension to the lower thread. The two threads thus form two interlocking loops. The slack of the upper one, caused by its being drawn out by the hook and carried around by the bobbin, is in part taken up by the needle, as it goes up preparatory to making the next stitch, and the two loops are drawn into the centre of the fabric by the hook enlarging the next loop. But as the loop is cast off from the hook when it has made about  $\frac{1}{4}$  of its revolution, and is not drawn up until the revolution is completed and the hook has entered the next loop, a little contrivance is introduced, called the loop check, which holds back the loop for an instant, and thus prevents any entanglement of the thread by its too rapid passage. This is merely a bit of leather, so placed as to press gently against the periphery of the hook, and hold the thread till a point of the periphery comes round where a hollow or bevel presents an opening that lets the

thread through. The method of forming the stitch may perhaps be better understood by the following illustration. Let a threaded needle be thrust head first through two thicknesses of cloth nearly to its point, and the loop on the side next the working end of the thread be spread open until it can be made to pass around a ball of thread, the end of which has been unwound sufficiently to meet the end of the first thread. The ball corresponds to the bobbin, and as the needle is withdrawn the double loop formed by the two threads will be brought into the centre of the cloth. A succession of stitches thus made forms a seam presenting the same appearance on each side of a single line of thread. The manner of keeping the bobbin thread at the proper strain or tension is described above. The upper thread passes from a spool, slipped upon a horizontal spindle in the back part of the machine, first around a tension pulley, to the side of which friction is applied by the pressure of a volute spring easily adjusted to any required degree. It then passes along the vibrating arm, which holds the needle, and down this through the eye in the point. It has always been difficult to keep the tension uniform in the shuttle machines with the varying velocities of the shuttle, both threads requiring attention and adjustment of the brakes attached to the supply spools; but by the arrangement described only one thread requires occasional attention. It is to be observed that by lessening the tension of either thread a different sort of stitch may be made, that thread being drawn entirely through the cloth, and the other running along straight through the loops. Such a stitch is sometimes desirable for gathering or for a temporary seam intended to be taken out. The consumption of thread by this machine was found on broadcloth to be three yards for one of work; and on common cotton cloth  $2\frac{1}{2}$  yards.—The next important improvement in the machine of Mr. Wilson is in the feed arrangement. This method, known as the "four-motion feed," or "rough surface feed with yielding spring pressure," consists of a narrow bar, about 4 inches long, slotted nearly its whole length. The slot is filled by the feed tongue, pivoted at one end, the other end being free for an up and down motion, and armed with two rows of small teeth. The feed bar is placed horizontally in the standards which support the cloth plate and directly under this, its teeth projecting through two little slots in the plate close to the hole made for the needle. The mandrel is immediately under the feed bar on the same line with it, and the lifting motion by which the tongue is thrown up to fix its teeth in the cloth laid on the surface of the plate is effected by a cam upon this mandrel, while a swell upon the side of the cam, at the same time striking an ear upon the under side of the feed bar, throws it forward. The teeth then drop, losing their hold upon the cloth, and the bar is thrown back by a spiral spring

against an eccentric stop attached by a pivot to the under side of the plate at the other extremity of the feed bar. The extent of the play of the feed bar determines the length of the stitch, and this is regulated by the eccentric stop, which is easily adjusted while the machine is in motion. Thus the stitch may be graduated from an eighth of an inch to the width of a single thread. The spring pressure, by which the cloth is kept down upon the plate, is applied by what is called the presser foot, which is held in a vertical slide above the work, and is let down upon it or raised up at any moment by the action of a little lever moved by the hand. A helix spring in the slide produces the needed pressure, and yet readily yields to the lifting action of the feed bar. A gap in the side or end of the foot admits the passage of the needle. In the regular succession of the various movements it happens that the only hold upon the cloth, when the needle is down, is that of the needle itself, and consequently at that instant any turn may be given to the work, and the stitches be made to succeed each other upon any line however curved or irregular. Thus various ornamental work, including the most elaborate designs, may be executed with great accuracy. The only attention to the cloth required of the operator is to guide it, the feeding being done entirely by the machine. The iron bed plate to which the working parts of the machine are fixed is 12 inches long, 7 wide, and  $\frac{1}{4}$  inch thick. The standards in front for supporting the mandrel, feed bar, and cloth plate are 2 inches high. About 8 inches behind the plate are the standards for the rocking shaft, which carries the needle arm, and to which a vibrating motion is given by a connecting rod from an eccentric upon the mandrel. Motion is thus communicated to the needle arm, the end of which carrying the needle vibrates up and down a distance of  $1\frac{1}{2}$  inches. The needle is about 2 inches long, and is slightly curved. The machine itself (intended for family use) weighs about 13 lbs., and the various parts of iron and steel are plated or otherwise ornamented. It is placed upon a table of black walnut, rosewood, or mahogany, supported on a cast iron stand, which also supports the sandal treadles, driving pulley, and fly wheel. A small leather band, quite out of sight, passes from the pulley through the table and around the pulley on the mandrel. But very little exertion is required to drive a sewing machine, and the exercise is generally regarded as rather beneficial than otherwise. A marked difference in favor of it is observed in the health and activity of those constantly employed upon them, and of those devoted for the same time to hand sewing. The driving pulley is usually graduated to give 5 stitches to each revolution or tread of the foot; and one accustomed to the work may make from 100 to 200 revolutions, or 500 to 1,000 stitches, a minute. When driven by steam power, as is often the case, it



is not extraordinary to make 2,000 stitches a minute.—Several accessories to the sewing machine have been contrived, which may be applied and used or not. Such are the hemmer, the binder, and the corder. The first, which is the most important attachment made to sewing machines since their invention, was patented Feb. 19, 1856, by S. P. Chapin. It takes the place of the presser foot, from which it differs in an opening in the end of the foot, in which a small scroll or gauge of steel causes the edge of the cloth as it passes through in the regular feeding to be turned over and folded as in ordinary hemming. It renders the usual turning and basting preparatory to hemming unnecessary, and fells and hems are stitched of any width or curve. It is taken out and the presser foot returned to its place without trouble. The binder is attached to the cloth plate, and used while sewing for folding the binding on the edges of dresses, cloaks, mantillas, vests, coats, hats, caps, shoes, &c. No basting is necessary, and more or less binding can be thrown on either surface of the work. The apparatus is easily adjusted and managed. The corder is also a simple attachment to the machine, and is useful for laying cord on shirt bosoms, collars, vests, coats, &c., without the necessity of previous basting.—A machine was patented Feb. 11, 1852, by W. O. Grover and W. E. Baker of Boston, Mass., for making what is now known as the "double loop stitch" or the "Grover and Baker stitch." Two threads are used, one in the point of a needle which passes through the cloth, and the other in a circular needle or hook which vibrates horizontally close under the cloth. The thread is passed 3 times through this hook, once through the eye at each extremity of the curve and once in the middle. Between the eyes it lies in a groove round the periphery. The manner of their operation is as follows: The upper needle having carried its thread down through the cloth, the circular one swings its point and thread into the loop. The needle then rises, leaving the loop around the circular needle and its thread. This remains in its place while the cloth is moved forward by its feed the length of a stitch, and the needle again descends, this time through the loop of the circular needle. Then this swings back drawing its own thread around the stem and thread of the upper needle, and before this rises the point of the circular needle makes another advance, and forms another loop through the loop of the upper needle, which then rises and draws the stitches tight. The cloth then moves forward, and the movements are repeated. The stitch on the upper side of the cloth is like that of the ordinary lock stitch; but on the under side a succession of 3 threads is seen, one passing around the loop that penetrates the cloth, thence back through the loop of the next stitch behind, then forward through the first loop below the turn the thread had made around it, and thence around the next

loop in advance, back through the bottom of the first, and so on through the next, &c. The work is thus made very strong, but with considerable expenditure of thread. A specimen of the work on common broadcloth was found by measurement to have taken up 47 inches of thread to 7 inches of work, or over 6½ yards to one; and on common cotton 32½ inches of thread to 6 inches of seam. The extra weight of this is in part compensated by the use of a finer thread for the lower side. The working parts of this machine, like most of the others, are constructed with great ingenuity and perfection, and are adapted to the sewing of the lightest and heaviest fabrics, to a considerable extent even without changing either needle, thread, or tensions. The raised or corded appearance of the stitch when a coarse thread has been used on the under side has sometimes an ornamental effect, as when colored silks are employed in stitching some sorts of leather and carriage work. The machine runs with great ease, rapidity, and little noise, and the same needle answers for a variety of work of different thickness. Both threads are used from the spools as purchased.—Among the most prominent machines are those of I. M. Singer and co., introduced in 1850, and afterward constructed of a variety of sizes for application to all the sorts of work upon leather, upholstery, and clothing for which sewing machines can be used. The machines have a peculiar feed called the wheel or continuous feed, a straight needle, and the eye-pointed needle and shuttle movement of Mr. Howe, and make the lock stitch. Many of the sizes are very large and heavy, and no other machines have been so generally employed for heavy manufacturing purposes, as by the large clothiers particularly.—Of the machines of the first class named, the most successful is that known as Willcox and Gibbs's, the principal feature of which was devised and patented June 2, 1857, by James E. A. Gibbs of Millpoint, Va. Knowing nothing of what had been done in sewing machines, he contrived the stitch and made a working model in wood. The character of the stitch and method of forming it bear some resemblance to those in the machine of Charles Morey, but the apparatus is of superior construction, and is connected with a number of the other principal patented movements of the best machines, as the feed motion of Wheeler and Wilson, the eye-pointed needle of Howe, &c. The shape of the needle itself and manner of adjusting it are secured by patent to James Willcox, and the machine has the exclusive use of a convenient, self-acting, and noiseless stop, by which a reverse motion of the wheels is prevented, and also of a guard to protect the dress of the operator from the rubbing of the balance wheel. The apparatus for catching and looping the thread as it is passed through by the needle consists of two arms making together a cross at the end of a horizontal axis. As this revolves close to the needle under the

cloth plate, one of these arms, shaped like a hook, and rapidly enlarging toward its base, catches the thread and spreads the loop, which is then brought against the axis and next slips upon the other arm, which gives the loop a twist and holds it. At the same time the needle goes up and comes down again through the cloth, carrying its thread through the loop already formed, when it is caught by the hook, and the first loop being released is drawn tight by the pulling of the hook in spreading the second. The twist given to the thread in forming the loop has a material effect in strengthening the hold of the thread in the cloth, and thus producing a very strong and durable seam. Its strength and little liability to rip may be readily seen by cutting a narrow strip across the seam of a piece of cotton thus sewed, and comparing it with a similar piece sewed by hand. On attempting to pull or rip the pieces apart, it will be found that the former thus tested is the stronger of the two. The tendency to ravel, hitherto the objectionable feature of machines of this class, is in this obviated by the drawing of the end of the thread through the preceding loop by the hook at the last stitch, and thus fastening it whenever it is broken by design or accident. If, however, this loop should be loosened and the end of the thread withdrawn, and then pulled, the whole seam may be unravelled like knitting work; but this can occur only when an end is first loosened in this manner, and no such result is likely to take place in ordinary wear. The needle, being short and straight, runs with perfect exactness and certainty across seams, and even over several abruptly increasing thicknesses of cloth. It is consequently well adapted for running at high rates of speed, and has thus been kept in operation for 3 months at a time by the Elm City company at New Haven, making over 3,000 stitches a minute. The company employ a considerable number of the machines in their manufacture of tape trimmings, and usually run them about 2,000 stitches a minute. The consumption of thread in sewing broadcloth was found to be 5 yards to one of work; and on common cotton 3½ to 4 yards.—Various other machines beside those named, and some of them possessing merit for peculiar purposes, might be described in a full treatise upon this subject. This article, however, can further present only an account of some appendages added to the sewing machine by Messrs. Singer and co., the object of which is to perform a variety of work to which sewing machines have not before been applied, such as sewing button holes, and cording and edging with several threads, which when of different colors produce an ornamental effect. The machine is not in appearance different from other sewing machines making the reciprocating lock stitch, except that the needle carrier may be provided with 2 or 3 needles instead of one. When 2 needles are used, each with its own thread, a compound

stitch is produced forming two parallel lines of stitches upon the upper surface, and on the under side these are connected on a zigzag line by the shuttle thread. The compound seam is particularly useful where lapped seams are required, as in tailoring and shoe and harness making; the seam when pulled is as elastic as the material itself. A fourth thread is introduced by adding a third needle, and this thread is made to pass on the upper surface, criss-crossing from one of the parallel rows to the other, and at each stitch is tied down by one of the longitudinal threads. Two edges of cloth being placed together without lapping, like the front seam of a lady's gaiter boot, may be thus closely united by passing once through the machine, instead of 3 times as is necessary with the ordinary machine. In this way also the edge of any garment may be neatly and strongly corded and finished, and ornamented in a variety of ways by the use of threads of different colors and sizes, and by various degrees of tension, so as to resemble embroidery. The contrivances by which these effects are produced are simple and add little to the cost of the machines.—The effect of the introduction of the sewing machine is materially felt by a great number of branches of manufacturing and commercial industry. The importation of foreign needles is very largely reduced, and the production of special sorts of thread adapted to the machine is now carried on extensively in the United States, diminishing the supplies formerly received from abroad. Almost every department of the clothing manufacture has been entirely revolutionized by it; and instead of its taking employment from the sewing women, it has so multiplied by cheapening work for the needle, that the demand for their services seems to have in no wise fallen off, while the machines afford to great numbers a more profitable and far less irksome mode of accomplishing their task than before. Moreover, very many, it is found, in the shirt manufacture especially, who could not do even passable work by hand, soon become prime makers with the machine. As an example of the extraordinary development it has effected in certain branches, may be cited that just named, a single establishment engaged in it employing over 400 machines, and producing about 10,000 shirts a week. Each machine does the work of about 6 hands, and the estimated saving to this establishment over hand work is about \$240,000 per annum. Already is the material benefit they confer upon the community experienced in the essential reduction in the prices of clothing. The following sums, it is estimated, are annually saved by the machine in the several branches of manufacture named:

Men's and boys' clothing, in New York city..	\$7,500,000
Hats and caps.....	482,500
Shirt bosoms.....	592,750
Boots and shoes in Massachusetts.....	7,500,000

The use of the sewing machine has recently been made a part of the education of young ladies in schools, like the Elmira female col-

lege, which introduced the movement, and in which certain branches of domestic industry form a part of the course of instruction. In the New Jersey state normal schools it is required of each member of the graduating class to devote an hour a day to practising with it under the guidance of a teacher. The Rutgers female institute in New York city, and also the ward schools in their female department, make an acquaintance with it a part of their educational course. The teachers appear with great unanimity to favor its adoption.—Though scarcely 10 years have passed since sewing machines first began to attract public attention, the demand for them has become so great, that numerous factories of the largest class have been brought into existence, which are exclusively

devoted to their construction. These are provided with the most ingenious mechanical devices of modern invention for perfecting every part of the machines, diminishing the labor in their construction, and introducing that important feature adopted in American clocks, watches, and muskets, of making all the duplicate pieces intended for different machines such perfect facsimiles that they may be taken indiscriminately from the various lots, and fitted together without the slightest change of form. The capital invested in the manufacture is supposed to amount already to not less than \$5,000,000. Its rapid increase and present large amount is evident from the following table, which presents the annual sales of the principal companies for the years named:

Manufacturers.	1853.	1854.	1855.	1856.	1857.	1858.	1859.	Total.
Wheeler and Wilson.....	799	956	1,171	2,210	4,591	7,973	21,904	33,991
Grover and Baker.....	657	2,094	1,145	1,953	3,880	5,070	10,250	24,513
I. M. Singer and co.....	810	879	889	2,564	3,680	3,594	10,933	23,333
Willcox and Gibbs, from May, 1859, to Nov. 1861.....	....	....	....	....	....	....	....	7,714
Ladd and Webster*.....	100	263	73	180	453	400	1,733	3,359
A. B. Howe.....	....	60	53	47	133	179	921	1,393
Bartholm*.....	185	55	81	35	81	203	747	1,287
Leavitt and co.....	23	217	152	295	195	75	213	1,115
Finkle and Lyon.....	....	....	....	....	....	....	....	530
All others.....	....	....	....	....	....	....	....	809
<b>Total.....</b>	<b>2,529</b>	<b>4,469</b>	<b>3,513</b>	<b>7,223</b>	<b>12,713</b>	<b>17,559</b>	<b>46,208</b>	<b>103,372</b>

The sales of 1860, while much larger in the aggregate than those of 1859, were divided among a greater variety of machines, produced by establishments set in operation for a short time on the expiration of Howe's patents, and while it was doubtful whether these would be renewed. The extent of these sales cannot be ascertained; but it is certain that they materially affected those of the older companies, till on the extension of the patents the business of these was reestablished upon a larger scale than before. The firm last named in the table (Finkle and Lyon) now ranks among the principal manufacturers.—It is remarkable that while the immense value of this invention has been so readily perceived in the United States, its use should have been until recently almost exclusively limited to this country, until the machines attained their present high state of perfection and cheapness of production, which are now placing them beyond competition in foreign markets. A writer in the London "Mechanic's Magazine" of April, 1860, fully sets forth the condition of the invention in England. The first patentees of the sewing machine, Duncan, Bostwick, and Fisher and Gibbons, derived no benefit from their inventions. Of the 200 patents which have been granted, not more than 20 have ever been brought into use, and out of probably 100 patentees only 8 are engaged at present (April, 1860) in the manufacture and sale of machines. "Nearly all the inventions in this trade have been made and patented by foreigners; yet with 8 or 4 exceptions foreign-made machines are not sold publicly in this country; and for

nearly 2 years machines manufactured abroad could not be introduced into England except by smuggling." The trade has been greatly checked by the liability to prosecution for infringement of patents, which have been used after all merely as expedients to frighten capital away from the trade. In Scotland and Ireland there have been fewer restrictions, and the trade has comparatively flourished, the introduction of American machines stimulating the demand for the home-made. In England only 4 establishments are engaged in the manufacture of machines, and only 7 in their sale. "English-made machines are inferior in appearance, mechanical accuracy, and finish to those made in America, and our manufactories cannot compare with those in Boston, Bridgeport, New York, Philadelphia, and Paris, if indeed there is any thing in England worthy of the name." Another cause of the great start which the business has attained in this country is the policy pursued by Mr. Howe from the first of granting licenses for the use of his patent, and thus interesting skilful mechanics and enterprising capitalists in the production and sale of the machines. But in England the purchaser of Mr. Howe's patent in 1846 adopted an exclusive policy, and was unable himself to produce the machines at such cost and quality as to render them popular. So far it appears that the same work cannot yet be produced in Europe at so low cost as the prices of the American machines; and thus a new item is added to our foreign exports, which has already attained considerable magnitude for so new an article, the number of machines sold abroad being probably not less than 15,000 per annum.

\* Ceased operations.

**SEXTANT**, an instrument used in land surveying and in nautical observations, for measuring the angular distance between two objects. Its principle is explained in the article **QUADREANT**, which instrument it has entirely superseded for observations at sea on account of its greater portability, while for important land surveys the full circle is preferred.

**SEXTUS EMPIRICUS**, a Greek empirical physician and sceptical philosopher, a native of Mytilene, who probably flourished in the first half of the 3d century. His medical writings are lost. Two works remain from him: *Pyrrhonia Hypotyposes*, in 8 books, an exposition of the doctrines of the sceptics; and a treatise against the mathematicians, in 11 books, in which he attacks all the sciences, both physical and metaphysical. A clear and acute writer, he collected and systematized all that ancient scepticism advanced against the certainty of knowledge, and his works are a vast repository of doubts. He has been called the Bayle of antiquity. To every doctrine he opposes an opposite one, and maintains that constant suspense of judgment is not only necessary, but can alone make a man happy. An edition of both works, with a Latin translation, was prepared by J. A. Fabricius (Leipsic, 1718; a reimpression, 2 vols., Leipsic, 1842). Bekker published an edition, with an amended text (Berlin, 1842).

**SEYOHELLES**. See **MAURITIUS**, vol. xi. p. 298.

**SEYFFARTH**, **GUSTAV**, a German archæologist, born at Uebigau, Saxony, July 13, 1796. He studied philology and theology at the university of Leipsic, where in 1823 he became *Privatdocent*, and in 1825 extraordinary professor of archæology. His first extensive work, *De Sonis Litterarum Græcarum tum genuinis, tum adoptivis* (Leipsic, 1824), treated of the pronunciation of the ancient Greek language; but he soon devoted his literary labors almost exclusively to Egyptian hieroglyphics. He undertook the continuation of Spohn's work, *De Lingua et Litteris Veterum Egyptiorum* (2 vols., Leipsic, 1825-'31), and published simultaneously his *Rudimenta Hieroglyphices* (1826). According to the theory adopted by Seyffarth, every hieroglyph expresses those consonants which its name contains. From a literary journey through Italy, France, England, and Holland, which he commenced in 1826, he brought home more than 10,000 copies of Egyptian inscriptions and Coptic manuscripts. He published a number of other archæological works, as *Grundsätze der Mythologie* (Leipsic, 1843), *Untersuchungen über das Geburtsjahr Christi* (1846), and many others, which are full of bold hypotheses, and involved him in a number of bitter and protracted controversies. His theory of hieroglyphics he maintained against Champollion and others in several pamphlets. In 1855 he emigrated to the United States, and was for some time professor in the Lutheran college of St. Louis. In 1857 he published at New York a "Summary of recent Discoveries in Biblical Chronology, Universal History, and

Egyptian Archæology," both in English and German, beside a number of pamphlets and reviews (see "Evangelical Review"); and in 1860 a pamphlet in German refuting the chiliasts. He is now (1861) engaged upon an elaborate work of astronomical calculations.

**SEYMOUR**, **EDWARD**, duke of Somerset, better known as the protector Somerset, born about the commencement of the 16th century, beheaded on Tower hill, Jan. 22, 1552. He was the eldest son of Sir John Seymour, was educated at Oxford, and in 1538 received the honor of knighthood from the duke of Suffolk. After the marriage of his sister, Jane Seymour, with Henry VIII., he was created Viscount Beauchamp and earl of Hertford, and gradually became one of the most powerful noblemen about the person of the king, his *prestige* being strengthened by military successes gained in Scotland and France in 1544. He was one of the 16 persons appointed by Henry VIII. in his will to be his executors and the governors of the young king, Edward VI., the nephew of Seymour; and in Feb. 1547, he was created duke of Somerset. On March 12 succeeding he was appointed by patent protector and governor of the king and his realms, his nomination being strongly opposed by the lord chancellor Wriothesley, who formed a party hostile to the protector and the reformation. His brilliant victory over the Scots at Pinkie, Sept. 10, 1547, greatly strengthened his influence, and for upward of two years after the accession of his nephew his authority was invested with all the attributes of royalty. His leaning toward the commons and his attempts to reform various social evils gradually aroused against him a powerful party, headed by the earl of Warwick, who had been one of his most confidential counsellors; while the zeal with which he had promoted the unjust condemnation and execution for high treason of his brother, Lord Thomas Seymour, disgusted the people. On Oct. 13, 1549, he was deprived of the protectorship and committed to the tower, whence however he was released, with a full pardon, in February succeeding. He resumed his place in the council, but in Oct. 1551, was again arrested through the influence of his enemy Warwick, now become duke of Northumberland; and having been convicted of felony in an attempt to imprison the latter, he was executed, to the regret of the populace. Somerset was sincere and consistent in his attempts to establish the doctrines of the reformation in England, and his government deserves commendation for the protection it afforded to refugees, both political and religious, who had sought an asylum in England. The execution of his brother and of the accomplished earl of Surrey through his instrumentality, are the chief blemishes in his political career.—**LADY JANE**, sister of the preceding, and 3d queen of Henry VIII., born about 1510, died Oct. 24, 1537. She was a maid of honor to Queen Anne Boleyn when the king first fell in love with her,

was married to Henry on the day succeeding Anne's execution, and died 12 days after giving birth to Edward VI.

SEYMOUR, SIR GEORGE HAMILTON, an English diplomatist, born about the end of the last century. He was educated at Oxford, and entered the public service in 1817 as attaché to the embassy at the Hague. The year following he was private secretary in the foreign office. In 1822 he attended the duke of Wellington on a special mission to Verona, was afterward secretary of legation successively at Frankfort, Stuttgart, Berlin, and Constantinople, and was sent as ambassador to Tuscany in 1830, to Belgium in 1836, to Portugal in 1846, and to Russia in 1851. At St. Petersburg his great skill was successful in unmasking the designs of the Russian czar against Turkey, and his confidential despatches kept his government well advised of the movements which threatened the peace of Europe. He left St. Petersburg at the emperor's request a few weeks before the commencement of hostilities. In 1855 he was made a member of the privy council and ambassador to Vienna, holding the latter office till April, 1858.

SFORZA, the name of a celebrated Italian family, several members of which were sovereign dukes of Milan during the 15th and 16th centuries. I. GIACOMUZZO ATTENDOLO, the son of a peasant, and the founder of his house, born at Cotignola, a small village in the Romagna, in 1339, died in 1424. He followed for some time the occupation of a farm laborer, but afterward became one of the most famous *condottieri* of Italy, and received the name of Sforza from his Herculean strength. Having gathered a band of 1,000 horsemen, he actively participated in the political struggles of the age, and about 1416 had risen to such power that he held garrisons at Rome and in several strongholds of the papal territory and the kingdom of Naples. In the quarrels between Joanna II. of Naples and her second husband Jacques de Bourbon, count of La Marche, he sided with the queen, whose triumph he finally secured, and received from her the rank of grand constable of the kingdom, with several important fiefs. In 1420, yielding to the influence of Pope Martin V., who had given him his native village of Ootignola as a fief with the title of count, he aided Louis III. of Anjou against the queen; but soon returning to his allegiance, he protected Joanna against her opponent Alfonso of Aragon, and while marching against his rival, the celebrated Braccio di Montone, was drowned in attempting to cross the river Pescara. II. FRANCOESCO ALESSANDRO, duke of Milan, the natural son of the preceding, born in 1401, died in 1466. Although but 23 years old when his father died, he succeeded him in the command of the mercenary bands upon whom his power rested. Enlisting in 1426 in the service of Filippo Maria Visconti, duke of Milan, then at war with a formidable league headed by the republic of Venice, he was de-

feated at Macalo by another *condottiere*, Carmagnola, in 1427, but regained his ascendancy in 1431, when he won over him a decided victory at Soncino. Under pretence of giving force to the decrees of the council of Basel against Eugenius IV., he wrested the province of Ancona from the pope. Entering the service of the Florentine republic against Visconti, who had displeased him, he beat the Milanese under Piccinino and conquered Lungenia in 1437; returning to his former ally, was sent by him to Naples to support René of Anjou against his competitor Alfonso of Aragon; then going over again to the Venetians, defeated the troops of Visconti in 1440, and invaded his territory; and finally, receiving the hand of the duke's illegitimate daughter Bianca, forced Florence and Venice to grant that prince the peace of Capriana (1441). Visconti treacherously attempted to crush his son-in-law by forming a league of nearly all the Italian princes against him; but, concentrating his whole force in the province of Ancona, Sforza routed his enemies at Monte Lanro and Mont' Olmo in 1444; and when, notwithstanding these successes, he was on the eve of succumbing to superior forces, he received timely aid from the republic of Venice and from Florence, now under the control of his friend and banker, Cosmo de' Medici. On Filippo Maria's death in 1447, Milan established a republican form of government. Francesco engaged in the service of the new republic, but soon gained adherents, secured to himself the most important towns in the territory, and, having gradually bereft the metropolis of every means of resistance, subjected it to such rigorous blockade that the inhabitants surrendered in 1450, when he was proclaimed duke, in which capacity he was acknowledged by all the powers of Italy except Venice and Naples. Being attacked by the former in 1452, the new duke, two years later, forced her to sign the peace of Lodi, which settled the frontiers between the two states. He now strengthened his power by allying himself with Alfonso of Aragon, king of Naples, made himself master of Genoa in 1464, and succeeded in controlling the whole politics of Italy. His protection of science and literature, his liberality toward the learned exiles from Constantinople, and the public improvements that were accomplished under his reign, entitle him to a high rank among the princes of his age. III. GALEAZZO MARIA, son and successor of the preceding, born in 1444, assassinated in 1476. He was serving Louis XI. of France at the time of his father's death, and returned hastily in disguise to Milan, where, owing to his mother's energy, he was proclaimed duke; but he proved cruel and tyrannical, gave himself up to luxury and debauchery, and was charged with poisoning his first wife and his own mother. His second wife was Bona of Savoy, the sister-in-law of Louis XI. He was finally assassinated on his way to church by 8 conspirators, who called on

the people to rise and reclaim their liberty; but the appeal was not responded to, the conspirators were put to death, and Giovanni Galeazzo, 8 years old, was proclaimed duke under the regency of his mother, Bonne of Savoy. IV. LUDOVICO, called IL MORO, either from his tawny complexion or from the mulberry tree on his coat of arms, brother of the preceding, died in 1510. In 1479 he seized the reins of government in Milan, assuming the title of regent. His nephew, who had married the daughter of Ferdinand, king of Naples, being treated as a prisoner, Ferdinand remonstrated and was arming against Ludovico, when the latter in 1494 invited Charles VIII. of France to undertake the conquest of Naples; and Galeazzo dying soon after, probably by poison, Ludovico proclaimed himself duke. Turning now against the king of France, he formed a league of all the northern powers of Italy to prevent his return from Naples; but the victory of Fornovo, won by the impetuosity of the French troops in 1495, partially baffled his hopes. In 1499 he was attacked by Louis XII., who claimed the duchy in the right of his grandmother Valentina Visconti, and being forced to fly from Milan took refuge at Innspruck, near the emperor Maximilian. The tyrannical administration of the French governor gave such dissatisfaction to the Milanese that, with the aid of mercenary troops from Switzerland, Ludovico was enabled to reconquer his duchy; but on a new invasion of the French in 1500, he was betrayed by his auxiliaries, taken prisoner while trying to escape in the disguise of a monk, and sent to France, where for the remainder of his life he was confined in the castle of Loches. V. MASSIMILIANO, son of the preceding, was placed on the ducal throne by the "holy league" in 1512, when they succeeded in expelling the French from Italy; but inspiring neither respect nor affection, he was overthrown by his subjects on the arrival of a French army in 1513. On the defeat of this army at Novara, he succeeded in reëntering Milan, and subjected to enormous fines such towns as had opened their gates to the enemy. He finally lost his crown in 1515, when Francis I. of France won the victory of Marignano (Melegnano), and gave up all his rights to it, on condition of receiving a handsome pension, repaired to France, and lived there until 1530. VI. FRANCESCO MARIA, younger brother of the preceding, was living obscurely when the emperor Charles V. and Pope Leo X. thought to reëstablish the house of Sforza on the ducal throne of Milan, and called him thither in 1522; but, being merely a tool in the hands of his imperial protector, he drew odium upon himself by the heavy taxes he was compelled to lay upon his subjects, as war contributions. He died in 1535, without issue, bequeathing his duchy to Charles V.

'SGRAVESANDE. See GRAVESANDE.

SHACKELFORD, a new N. W. co. of Texas, intersected by the Clear fork of the Brazos

river, and several large creeks; area, 550 sq. m.; pop. in 1860, 44, of whom 9 were slaves. It has several extensive and fertile valleys, and is well timbered. The proposed route of the Memphis and El Paso railroad passes through the county. Capital, Shackelford.

SHAD, a well known fish of the herring family, of the genus *alosa* (Cuv.), differing from the herrings proper (*clupea*) in having the centre of the upper jaw deeply notched. The lower jaw is the longer; the teeth are small and deciduous, in the jaws only; the air bladder is simple, opening from the stomach. The genus comprises more than 20 species, among which are the alewife, blue-back, menhaden, and shad herring. The American shad (*A. prastabilis*, De Kay, or *A. sapidiissima*, Storer) is about 20 inches in length, and varies in weight from 2 to 6 lbs.; the upper part of the sides and gill covers are coppery, lower part of sides silvery, abdomen pearly, and top of head and back bluish; a more or less distinct black blotch at the posterior angle of the gill cover; irides silvery; dorsal on anterior part of back, quadrangular, transparent, and shutting in a groove; pectorals and ventrals small, and anal low and partly received in a groove; caudal deeply forked, with a patch of small scales and 2 membranous appendages at its base; scales large, and abdominal ridge serrated. They come from the south to deposit their spawn, running up the rivers from the sea; they appear at Charleston in January, at Norfolk in February, at New York by the end of March or beginning of April, at Boston by the end of April, and in the bay of Fundy by the middle of May. In northern markets they bring from 50 to 60 cents apiece, according to the supply and the lateness of the season. They appear in the Massachusetts rivers early in May, the greatest run being when the apple trees are in full blossom; the shad fly (*hemerobius*) appears at the same time, covering the houses and fences; the old return to the sea in August, and the young, 3 or 4 inches long, in September. It is a common belief that the life of the shad is limited to a single year, death taking place soon after the young are hatched, even Valenciennes sharing this opinion from phenomena noticed in the Seine; it is also said that they may be bred in ponds, becoming however an easy prey to voracious fish after the spawning season. From 1833 to 1857 the number of barrels inspected in Massachusetts varied from 300 to 1,600, the number in 1857 being 473 barrels; in Charles river from 1833 to 1838 about 6,000 fish were caught annually, and about half as many in Taunton river; about 1800 they were scarce in the Merrimack, though before that time so abundant that 10,000 have been taken at a single haul of a net; in this river they became plentiful about 1810, then scarce for a few years, and then again abundant to the present time; Concord river being warmer than the Merrimack, they were formerly caught in it a month earlier, but they have

now almost entirely disappeared, being unable to surmount the dams; they devour flies eagerly in these rivers. In the Delaware and Hudson rivers, whence New York is mainly supplied, this fishery is prosecuted by drift and stake nets, and its commercial value is considerable. The fish are with us mostly eaten fresh, and are delicious, the only drawback being the innumerable bones; they lose their flavor the longer they remain in fresh water. On the good authority of Mr. H. W. Herbert (Frank Forester) they will rise to a gaudy fly in fresh water, and afford very exciting sport. Their food in salt water consists principally of worms like the shad or slug worm, and shrimps, which they seek on muddy flats. The shad fishery is of considerable importance to the British provinces; in the upper part of the bay of Fundy, on the New Brunswick side, the fishing is mostly carried on in the channel by drift nets from 25 to 30 fathoms long, sinking to a depth of about 16 feet, with meshes of  $4\frac{1}{2}$  to 5 inches, so as to take only the large and fat fish; it continues from July to the middle of September, and does not interfere either with seed-time or harvest; a person in a favorable season will catch 20 to 30 barrels, worth from \$6 to \$7 each; the fishing is conducted in sloops about 18 by  $7\frac{1}{2}$  feet; the nets are often greatly injured by the thresher shark; the fish are split and salted, and mostly used in the neighborhood. Shad are sometimes caught in standing weirs set on the flats, but these soon destroy the fishery, as fish of all sizes are taken; in standing nets many fine fish are lost by falling out unless narrowly watched. Stake nets are each about 100 fathoms long, set on stakes or poles about 15 feet apart on the mud flats, and are dry at low water; most of the fish in these are caught on the ebb tide. The value of the New Brunswick fishery is at least \$30,000 annually. This fishery is also of importance on the Nova Scotia side of the bay of Fundy, but amounts to nothing on the Atlantic coast of Nova Scotia; shad are also taken in the gulf of St. Lawrence. They require at least  $1\frac{1}{2}$  bushels of salt to the barrel for proper preservation.—The hickory shad (*A. lineata*, Storer) is about 15 inches long, silvery on the sides, with 6 or 8 indistinct bluish longitudinal bands; the gill covers are coppery, the anal and ventrals nearly white, and the other fins dark brown. It is not a common species, and is taken off Provincetown, Mass., in the mackerel nets in May and June; it is lean, and is not used for food.—The European shad (*A. vulgaris*, Val.) in a similar manner ascends the Thames and the Severn, the Volga, Elbe, Rhine, Seine, Garonne, Loire, &c., from the Atlantic and other seas, in numerous troops during the spring, varying greatly from year to year. It attains a length of 2 to 3 feet, and is dark green above and silvery below, with a dusky patch behind the gill covers; it is abundant in the Severn and the Loire, and its flesh is much esteemed. Cuvier and

Yarrell describe the *A. finta*, the twaite shad or May fish, about 14 inches long, with teeth in both jaws and several black spots on the sides, and a dry insipid flesh. Valenciennes maintains that this is only the young of the *A. vulgaris* before the teeth have fallen, and declares that only one species is found in the waters of Europe.—The head of the shad presents a good example of the water tubes through which, in many fishes, fluid is introduced into the blood and the system generally; the object of this apparatus, often very extensive, is commonly stated to be for the purpose of accommodating the body to the pressure of different ocean depths; the orifices may be seen with the naked eye, or with a feeble magnifying power.

SHADDOCK (*citrus decumana*, Willd.), a low tropical fruit tree of the natural order *aurantiaceæ*, having spreading prickly branches, large leaves on winged footstalks, very large white flowers, and unusually large, roundish, pale yellow fruit, the pulp red or white, the juice sweet or subacid, the rind thick, white, and bitter. It is a native of India, and is also one of the characteristic fruit trees of the West Indies, having been long introduced and extensively cultivated under many varieties. The juice of the fruit has cooling and aperient properties. The tree can be propagated in the same manner as the orange or lemon.

SHADWELL, THOMAS, an English dramatist, born in Norfolk in 1640, died in 1692. He was educated at Caius college, Cambridge, and began to study law, but abandoned it, spent some time in foreign travel, and upon his return took up his residence in London, and wrote for the stage. He was very successful, and obtained so great a reputation as a writer that he was set up as a rival of Dryden, upon whose dismissal in 1688 he became poet laureate and historiographer to the king. He was the hero of Dryden's satire of "MacFlecknoe." His dramatic works were published collectively in 1720 (4 vols. 12mo.).

SHAFTESBURY, LORD. See COOPER, ANTHONY ASHLEY.

SHAG. See CORMORANT.

SHAGREEN (Pers. *shagri*, *shagrain*), a preparation of the skins of horses, wild asses, and camels, resembling parchment in its character more than leather, though commonly classed as a variety of the latter. It is a product of Astrakhan in Russia and the countries of the East, and the method of its manufacture is as follows. Thick strips are cut from the skins along the chine, and having been deprived of the hair and dressed in the usual process of currying, each one is stretched by strings fastened to its edges in a square wooden frame. It is kept moist, and is occasionally stretched still more, till it becomes smooth and tense as a drum head. While still moist, the hair side is sprinkled over with the hard shining black seeds of a species of *chenopodium*, and these being covered with a piece of felt or thick cloth,



the seeds are pressed into the skin by trampling with the feet or by a simple press. The skin retaining the seeds is then dried in the shade, and being afterward beaten the seeds fall out, leaving the surface indented with their pits. The opposite smooth side is then shaved down nearly to the bottom of the pits, and on macerating the skin in water the depressions appear in little swellings on this side, which remain permanent, and become hard with the rest of the skin when dried. When the strips have been steeped in a warm solution of soda, and cleansed with salt brine, they are ready for dyeing. Shagreen was formerly much used for scabbards of swords and for the cases of instruments, spectacles, and watches.

SHAHABAD, a province of British India, presidency of Bengal, bounded by the districts of Ghazipoor, Sarun, Patna, Behar, Mirzapore, and Benares; area, 4,403 sq. m.; pop. 1,600,000. The principal towns are Arrah, the capital, Buxar, and Sasseram. The Ganges forms the N. boundary line, the Sone the E. and S. E., and the Carumnassa the W., and all these rivers are navigable. The N. part of the country is a slightly undulating plain, but the S. is rugged and hilly, and rises into a table land about 700 feet above the level of the sea and 500 above the Ganges. There is a diamond mine near the river Xoyel. A large portion of the surface is covered with jungle. The chief crops are rice, sugar, cotton, opium, indigo, and tobacco. There is considerable manufacturing industry. The roads of the district are very good. The British obtained possession of the S. part of the country from the emperor of Delhi in 1765, and of the N. part from the king of Oude in 1775.

SHAHJEHANPOOR, a district of British India, in the North-Western provinces, bounded by Bareilly, Oude, Furruckabad, and Budaon; area, 2,483 sq. m.; pop. 812,588. The surface is flat, with a general inclination toward the S. E. Its principal streams are the Dooah-Gurrah and Ramgunga, tributaries of the Ganges. About  $\frac{2}{3}$  of the land is arable, and exceedingly productive. Shahjehanpoor was formerly part of the possessions of the Rohilla Patans, but their authority was overthrown by the British in 1774, when it was annexed to the territory of their ally the nabob of Oude. In 1801 it was ceded to the East India company in commutation of a subsidy. During the sepoy revolt the territory was in 1858 the scene of several actions between the British troops and the mutineers.—SHAHJEHANPOOR, the capital, is situated on the left bank of the Gurrah, in lat.  $27^{\circ} 52' N.$ , long.  $79^{\circ} 58' E.$ ; pop. 62,785. It was in 1858 the scene of a gallant defence. A wing of an infantry regiment and a few native cavalry and artillery with 4 guns intrenched themselves in the gaol, and held their position against a force of 8,000 mutineers and 12 guns from the 2d to the 11th of May.

SHAKERS, the popular name of a religious sect who call themselves the "United Society

of Believers in Christ's Second Appearing," originating in England about the year 1770, but now confined to the United States, where they have 18 societies and about 5,000 full members, beside some hundreds of novitiates. They were at first an offshoot from the Friends or Quakers, their founders having been connected with that body, and the sect generally holding similar views relative to spiritual illumination, giving testimonies, objecting to the legal oath, to war, slavery, &c.; but in their theological creed, as well as in their practices, they now differ entirely from the Friends, with whom indeed they profess no particular affinity. In 1747 some members of the society of Friends in the vicinity of Manchester, England, formed themselves into a distinct association, of which Jane and James Wardley were the leaders. Of this society the parents of Ann Lee were members, and she herself became one of its adherents in 1758. For several years this little company were only remarkable for greater physical manifestations of their spiritual illumination than most of the assemblages of Quakers, such as dancing, shouting, trembling, speaking with tongues, &c. These manifestations called down upon them the hostility of the populace, and even of some magistrates and clergymen, who charged them with thereby violating the sabbath. Several of the members, including the Wardleys and Ann Lee and her family, were imprisoned, fined, and roughly used. In 1770 Ann Lee professed to have received, by a special manifestation of divine light, those revelations in virtue of which her followers have ever since given her the name of Mother Ann, and have regarded her as a person inspired by the Christ of the female order. In 1774, under authority of a revelation to Mother Ann, 10 of the more prominent members of the society, including Ann Lee and several of her relatives, emigrated to America, arriving in New York Aug. 6; and 8 of them, proceeding up the Hudson, settled at Niskayuna (now Watervliet), 7 miles from Albany, then a wilderness. Here they remained, without any considerable accession to their numbers, for 3 $\frac{1}{2}$  years. In 1779 a religious excitement, or revival, occurred at New Lebanon, Columbia co., N. Y., accompanied by those extraordinary physical manifestations which subsequently characterized a similar revival in Kentucky, and have been observed in our own time in Sweden, and more recently in Ireland. When these manifestations had subsided, in the spring of 1780, some of those who had been most affected by them visited Mother Ann at Watervliet, and there, as they believed, found the key to their religious experiences. Their report drew others to her, and the number of adherents to her doctrines increased rapidly up to the time of her death in 1784, and indeed for some months after.—The idea of a community of property, and of Shaker families or unitary households, was first broached by Mother Ann, who formed her little family into a model

after which the general organizations of the Shaker order as they now exist have been arranged. In 1787, Joseph Meacham, formerly a Baptist preacher, but who had been one of Mother Ann's first converts at Watervliet, collected her adherents in a settlement at New Lebanon, and introduced both principles, together probably with some others not to be found in the revelations of their foundress. Within 5 years, under the efficient administration of Meacham, 11 Shaker settlements were founded, viz.: at New Lebanon, N. Y., which has always been regarded as the parent society; at Watervliet, N. Y.; at Hancock, Tyringham, Harvard, and Shirley, Mass.; at Enfield, Conn. (Meacham's native town); at Canterbury and Enfield, N. H.; and at Alfred and New Gloucester, Me. There were no other societies formed till 1805, when 3 missionaries from New Lebanon visited Ohio and Kentucky, and were ultimately successful in founding 4 societies in the former state (Union Village, Watervliet, White Water, and North Union), and 2 in the latter (Pleasant Hill and South Union). These settlements are composed of from 2 to 8 "families," or households. A large dwelling house, divided through the centre by wide halls and capable of accommodating from 80 to 150 inmates, is erected for each family, the male members occupying one end and the females the other. The societies all possess considerable tracts of land, averaging nearly 7 acres to each member. They believe idleness to be sinful, and hence every member who is able to work is employed in some labor. They have usually very extensive gardens connected with their settlements, and the culture of flowers, medicinal herbs, fruits, and vegetables has been a favorite business with them; garden and flower seeds, and the dried herbs and medicinal extracts, fluid and solid, in use by physicians, have been largely produced by them. Of late years they give more attention to agriculture and to manufactures than formerly. The broom business is extensively carried on by all the societies. Their land is always in excellent condition, and every thing about their establishments is perfectly neat and orderly. They usually have at their villages one or more storehouses and separate buildings for dairy or mechanical purposes, a school house for the children they adopt, and a meeting house or hall. The meeting house at New Lebanon, N. Y., is of a very original and chaste style. Their schools are excellent, and supplied abundantly with apparatus and libraries.—Their mode of worship is peculiar, as in it they exercise both soul and body. The two sexes are frequently arranged in ranks opposite to and facing each other, the front ranks about 6 feet apart. There is usually an address by one of the elders upon some doctrinal subject, or some practical virtue, after which they sing a hymn; then they form in circles around a band of male and female singers, to the music of whom they "go forth in the

dances of them that make merry," in which they manifest their religious zeal; and at times the excitement and fervency of spirit become very great, and their bodily evolutions, while maintaining the order and regularity of the dance and the music, are almost inconceivably rapid. They believe themselves to be frequently under the immediate influence of spirit agency, both of angels and of the departed members of their own fraternity who have advanced further than those still in the body in the work of the resurrection or redemption from the generative nature and order. They have a ministry, composed of 2 brethren and 2 sisters, who have the oversight of from 1 to 3 or 4 societies; also each family in every society has 4 elders, 2 brethren and 2 sisters, who have charge of the family. The temporalities of each family are cared for by 2 deacons and 2 deaconesses.—There are 8 classes of members: 1, the novitiates, who, receiving the doctrines of the Shakers, and living up to the general requirements of their faith, still prefer to reside with their own families, and manage their own temporal concerns, for a time; they are not controlled by the society, either as to their property, families, or children, and enjoy their spiritual privileges in connection with it, unless they violate its rules and principles; 2, the junior class, composed of persons who have become members of the Shaker communities, and unite in their labors and religious exercises, but who have not relinquished their property to the society, or, if they have given the society the improvement of it, may at any time resume it, though without interest; and 3, the senior class, comprising those who, after full experience of the system of the Shakers, voluntarily and deliberately consecrate themselves, their services, and all their property to the society, never to be reclaimed by them or their legal heirs. Those belonging to this class are called the church or senior order. No difference is ever made in this order on account of the amount of property any individual may have contributed. They, as well as all who retain their connection with the community, are amply provided for in health, sickness, and old age.—The Shakers hold that God is dual, there being an eternal Father and Mother in the Deity, the heavenly parents of all angelical and human beings, and that the revelation of God is progressive; that in the first or antediluvian period of human history, God was only known as a Great Spirit; that in the 2d or Jewish period, he was revealed as the Jehovah, the I am that I am; that Jesus in the 3d cycle made him known as a Father; and that in the last cycle, commencing with 1770, "God is revealed in the character of Mother, an eternal Mother, the bearing Spirit of all the creation of God." This last they regard as a revelation of God's affectional nature, as a manifestation of the divine love and tenderness. The Christ they believe to be also dual, male and female, a supramundane being, and at his first

appearing the agent of the new revelation to Jesus, who, in their system, was, a divinely instructed, pure, and perfect man, and who, by virtue of his anointing, became Jesus Christ. Among the truths of the new revelation are, the immortality of the soul, which Moses never taught, and the resurrection of the soul, by which they understand the quickening of the germ of a new and spiritual life, after the death of the first Adamic or generative life. All who marry and are given in marriage, or who indulge in the earthly procreative relation, they term "the children of this world," and followers of the first Adam as such; they do not condemn them for living in the marriage relation, provided they confine its use simply to the purpose of procreation, the production of offspring being the only justification of sexual intercourse; all beyond that they significantly designate as "the unfruitful works of darkness," and they sincerely condemn it as mere sensual gratification. But Shakers, as Christians, hold that they are called to lead a spiritual and holy life, not only free from all lust and carnal sexual indulgence, but even to rise above the order of natural and innocent human reproduction (which they say is proper enough for the "children of this world," and in a measure for gentle Christians), themselves being the "children of the resurrection," and as such they are daily dying to the generative nature, as Jesus and the apostles died to it, and are thus becoming new creatures who are able to comprehend the "mysteries of God." Another of the doctrines in which, as they believe, "Christ instructed Jesus," was human brotherhood, and its development in a community of goods, according to the example of Jesus and his apostles. The doctrines of non-resistance, non-participation in any earthly government, and the necessity of a life of celibacy and virgin purity to a perfect Christianity, they regard as having been communicated to Jesus by the Christ, and, though neglected by the church in the past, of prime obligation to the true believer. The second appearing of the Christ, "without sin unto salvation," they believe to have taken place, through Mother Ann Lee, in 1770. She, "by strictly obeying the light revealed in her, became righteous even as Jesus was righteous. She acknowledged Jesus Christ as her Head and Lord, and formed the same character as a spiritual woman that he did as a spiritual man." The necessity for a second appearing of Christ in the female form resulted from the dual nature of Christ and of the Deity. "Still it was not Jesus nor Ann, but the principles already stated, which were the foundation of the second Christian church. Their importance is derived from the fact of their being the first man and the first woman perfectly identified with the principles and spirit of Christ." This second appearing of Christ they hold to be the true resurrection state, and repudiate a physical resurrection as repugnant to science, reason, and Scripture. As they recognize 4 cycles of hu-

man religious progress, so they believe that there are 4 heavens and 4 hells, the first 3 of which are still places of probation. The first heaven and hell were respectively for the good and wicked among the antediluvians, and the wicked of that cycle were "the spirits in prison" to whom Christ preached in the interval between his death and resurrection. The 2d hell they name Gehenna, and consign to it the Jews and heathen who died before the coming of Jesus; while the 2d heaven is paradise, where the thief on the cross had the promise of going after his death. The second dispensation (by Moses) was designed to teach by revelation God's truth pertaining to the earth-life chiefly. They believe that a perfect system of agriculture, horticulture, and hygiene was gradually unfolded in the statutes of Moses, obedience to which, then and now, would give entire exemption from physical disease, or bodily infirmity; and that the principles contained in those laws and statutes are to-day as binding upon all Christians as are the ten commandments. (The Shakers eat no pork.) All human sickness, they say, is the result of some physiological sin against the teachings of Moses, direct or indirect. In proof of this position they cite the promise of Moses to Israel: "The Lord your God shall take all sickness away from the midst of thee," in obedience; but in disobedience, he would "bring back upon them all the diseases of the Egyptians," of which they were afraid; and of which diseases Moses had cured them in the wilderness by means of the physiological treatment under which he put at least 2,000,000 persons, giving them for food simple manna, and for drink and bathing cold water; to breathe, pure air in open well ventilated tents. The 3d heaven is that of the church of the first appearing of Christ, to which Paul was caught up. The 4th heaven is now forming; in it Jesus and Mother Ann reside, and to it will all those go who have resisted temptation until their evil propensities and lusts are all destroyed, and the life of the generative natural man is dead in them, for such are born of God, and cannot sin. No one but Jesus had ever attained to this previous to the second appearing of Christ in Ann Lee. It is the heaven of heavens, and to it will be gathered not only all who accept the doctrines of the Shakers in this world, and attain to the new birth, but all those in the lower heavens and hells who shall yet accept them; and when their decision is finally made, the lower heavens and hells and the earth will be destroyed, and only the 4th heaven for the true believers, and the 4th hell for the finally impenitent, will remain. Each cycle has had its own Holy Spirit, the spiritual influx from the church in the heaven of that cycle to the inhabitants of earth at the time. They hold to oral confession of sins to God, in the presence of one or two witnesses, as essential to the reception of the power to forsake sin. They also believe in the power of their members to heal physical disease, by means

of prayer and dietetics. The Bible they consider as a record of the most divine angelic ministrations to man (for they hold that the natural man never has seen and never will see God), and as a more or less imperfect record of the religious experience and history of the Jews. They believe that the mental and spiritual condition of those seers and prophets whose prophecies form a considerable part of it has materially modified the revelation, and that it has been further modified and impaired by the translators of the Scriptures; the book of Revelation has suffered less in this respect than any other, mainly because it is utterly unintelligible to the generative man, and could not be comprehended till the second appearing of Christ had transpired, as that was the only key to unlock its mysteries. The revelations of Ann Lee, and others of their ministers and elders who have been inspired by God to speak, they regard as valid and important.—The movement of the spiritualists has excited great hopes in their minds of a remarkable influx of disciples to Shakerism, inasmuch as they consider it a preparation of the people to receive their doctrines. Their increase during the present century has been moderate, only 3 societies having been formed within the last 50 years, and the growth of those previously in existence having been slow; but it is a fact worthy of note, that they are the only people on this continent, if not in the world, who have maintained successfully for more than 70 years a system of living, one of the fundamental principles of which is a community of property.

SHAKESPEAR, JOHN, an English orientalist, born at Lount, Leicestershire, in 1774, died June 10, 1858. He belonged to a family of farmers, but received a good education, and under the patronage of Lord Rawdon went to London, devoted himself to oriental studies, and was for many years professor in Ad-discombe college, which position he resigned in 1852. He was the first author of good elementary works for instruction in Hindostanee, and his grammar, dictionary, and "Introduction to the Study" of that language have passed through several revised and augmented editions. He also contributed to the study of Arabic literature, and furnished many papers to the "Journal of the Asiatic Society," of which he was a member from its foundation. He claimed no relationship to the dramatist, though he supposed he might be descended from a collateral branch of the same family, and was always careful to spell the names differently. Shakespeare's house at Stratford-upon-Avon having been purchased for preservation by the Shakespearian club, Mr. John Shakespear created a trust of £2,500 for the furtherance of that object; but this, together with an annuity of £60 to the club, was set aside by chancery in 1861 as invalid.

SHAKESPEARE, WILLIAM, an English dramatist, born in Stratford-upon-Avon, Warwickshire, in April, 1564, died there, April 28,

1616. The exact date of his birth is not known; but as there is a tradition that he died on the same day of the month as that on which he was born, and as the parish record of Stratford shows that he was baptized April 26, 1564, and it was common, if not customary, at that period to baptize children on the 3d day after their birth, the 28d of that month has, with much probability, been assumed as the day which gave the world the great poet of humanity. His father was John Shakespeare, probably the son of Richard Shakespeare, a well-to-do farmer of Snitterfield, a parish 3 miles from Stratford. The family had been long settled, or rather unsettled, in Warwickshire; for in spite of their name, which indicates a martial if not a knightly origin, and of the fact that traces have been discovered of their existence in various parts of that county as early as the 14th century, they do not appear to have ever attained the position of a *gens*, even of the minor order, with a fixed habitation for their head. John Shakespeare was a substantial yeoman, who is called, in parish record and tradition, successively a glover, a yeoman, a gentleman and freeholder, a butcher, and a considerable dealer in wool. Except in having his own cattle killed upon his own premises, he was probably never a butcher; but the other positions assigned him are not inconsistent with each other. More probably, however, he may have varied his occupation in the hope of bettering his condition. He seems to have been a man of intelligence and character; for he passed through the offices of ale-taster, Burgess, constable, affeeror, chamberlain, alderman, and high bailiff, to that of chief alderman and *ex officio* justice of the peace. Like many others of even higher rank than his at that time, he could not write his own name. He married Mary Arden, the youngest daughter of Robert Arden of Wilmeccote, a hamlet partly in the parish of Stratford. The Ardens were of the acknowledged gentry of Warwickshire; their family was ancient, and of some note in the county. Robert Arden was a considerable landed proprietor, although his daughter Mary inherited from him only an estate of about 54 acres, called Ashbies, at Wilmeccote, and a small interest in some other land and tenements near by, with £6 13s. 4d. in money, which however was equal to about £40 at this time. The marriage took place in the latter part of 1557. William Shakespeare was the third child and the first son of a family of 8. He had 3 brothers, neither of whom attained any distinction. In his infancy and early youth his father's circumstances were those of easy competency for a man in his rank of life. He owned two houses, each having a garden and one a croft attached to it; he rented a small farm, and bought at least two more houses with gardens and orchards. The house in Henley street, Stratford, in which it may safely be assumed that he lived from his marriage, if not 5 years before it, until his death, was a pretty and com-

modious dwelling for a man of his station at that time. It was divided into two, and allowed to go to rack and ruin in the latter half of the 17th century. The eldest son of a man in this position, William Shakespeare passed his childhood and his adolescent years under external circumstances at least ordinarily favorable to a healthy mental and physical development of his natural powers. There was an endowed grammar school at Stratford, among the pupils at which we may safely assume, having the support of tradition, was the son of the high bailiff and chief alderman of the town. What amount of learning Shakespeare acquired before he entered active life has been much disputed. Certain critics, the most prominent of whom are Charles Gildon and John Upton, have asserted for him a very considerable scholarship; others, at the head of whom is Dr. Richard Farmer, with much ingenuity and some reason, argue that he was ignorant of any language but that of which he was the greatest master. But his friend Ben Jonson, himself a very thorough and laborious, if not a very profound or variously learned scholar, said that Shakespeare had "small Latin and less Greek;" from which statement we may reasonably conclude that he knew enough of the former language to master such passages of it as he encountered in the course of discursive reading (and in his day these were many), though not enough to read Latin authors for pleasure, and that he had had the benefit of some instruction in the latter tongue. His notably frequent use of Latin derivatives in their radical sense favors this view of his classical attainments. Of Italian and French he seems to have acquired some knowledge in his youth or early manhood. But upon these points, as upon nearly all those connected with his personal life, we are left to the imperfect and unsatisfactory information derived from scanty tradition and deduction from his works; in which, however, he left fewer traces of his individuality and his experience than any other writer known to fame. Shortly previous to 1578 John Shakespeare's affairs became much embarrassed. In that year he mortgaged his property; his assessments by the corporation were reduced to one third of those paid by other aldermen; he was next excused from paying any thing for the relief of the poor; and finally an execution against him was returned "No effects" and another Stratford burgess was elected in his place, because he had long neglected to attend the "halls" or corporation meetings. He also, because he feared process for debt, which could then be executed on Sunday, remained away from church, and thus incurred suspicion of nonconformity. He however contrived to retain possession of his house in Henley street. Thus straitened in his means of livelihood, John Shakespeare would naturally seek to make his eldest son contribute something to his own support, if not to that of the family; and tradition tells us that he labored first with his father

as a wool-stapler and a butcher, and afterward as a schoolmaster and an attorney's clerk. It is reasonable to believe that, whatever were John Shakespeare's occupations, he did not lack his son's assistance in them. The story that he was a butcher rests only on the relation of an old parish clerk, born too late to have any personal knowledge of the matter. That Shakespeare had more than a layman's knowledge of law, his plays afford evidence, the weight of which cannot be dissipated by the plea of the universality of his genius. Genius reveals fundamental truth; but it cannot impart particular facts, or the accurate use of technical terminology. Whatever were the serious employments of Shakespeare's early youth, we may be sure that he was heartily inclined to all the sports suited to that period of life. Upon the authority of a tradition recorded by the Rev. Richard Davies, who died in 1708, he was "much given to all unluckiness in stealing vension and rabbits;" and although this was a comparatively venial fault in his day, it is probably true that the unconscious genius of Stratford sowed not a few wild oats in the fields thereabout while he was passing through his teens. In his roving he had fallen in with Anne Hathaway, the daughter of Richard Hathaway, a yeoman of Shottery, a village near Stratford. This young woman, who was 8 years older than Shakespeare, bore a daughter in May, 1583, of which he had assumed the paternity by marrying the mother at some time after Nov. 28, 1582, at which date the bishop of Worcester granted a license for the marriage of "William Shagspere one thone partie, and Anne Hathwey of Stratford in the dioces of Worcester, maiden," upon "once asking of the bannes," the bridegroom being at that time 18 and the bride 26 years old. Thus did Shakespeare find himself, the son of a ruined man, without a settled occupation, and lacking 8 years of his majority, a prospective father and the husband of a woman old enough to be his father's wife. We should not lightly pass over circumstances which he remembered long and sadly, as we learn from his sonnets, and by a passage in one of his plays ("Twelfth Night," act ii. sc. 4), written 18 years after, in the height of his reputation and his prosperity. How and where he lived with his wife, whether in Stratford or Shottery, we do not know. Nor has it been discovered how long he lived with her; but Hamnet and Judith, twin children of William and Anne Shakespeare, were baptized at Stratford, Feb. 20, 1584-5; after which we hear of no other offspring of this ill-starred union.—We know nothing positively of Shakespeare from his birth until his marriage, and from that date nothing but the birth of his 3 children, until we find him an actor in London about the year 1589. He was probably led to assume that profession by a union of inclination, opportunity, and necessity. Play-going was a favorite diversion in the days of Elizabeth, and in fact may be regarded as a means of popular instruction and culture, which then

supplied the place of the popular lecture, the light literature, and the newspaper of our day. The best players performed, of course, at London; but strolling bands went through the rural districts from town to town, and even the metropolitan companies sometimes travelled into the provinces. During Shakespeare's boyhood plays had often been performed at Stratford; and we may be sure that he lacked neither the means nor the appetite for their enjoyment. There is some reason to believe, also, that several of Shakespeare's seniors among the youth of Stratford had gone to London and adopted the stage as a means of livelihood. Thus stimulated by the memory of past enjoyment, pressed by urgent need, conscious of dramatic ability, and sure of finding acquaintances, if not friends, in the theatres of London, what wonder that he was soon knocking at the stage door? Other motive to such migration he did not need; but another has been furnished him by tradition. It is said that his poaching propensities led him to steal a deer from Sir Thomas Lucy of Charlecote, near Stratford, and that, being harshly treated by the knight, he revenged himself by a lampooning ballad which he stuck upon the gates of the park which he had violated. The ballad, as it has come down to us, is coarse, though clever; it irritated Sir Thomas so much that he redoubled his persecution of Shakespeare, and being the most important man in that vicinity, he drove the poor lad out of Stratford. This story, first told by Rowe, on the information of Betterton, the actor, in "Some Account of the Life of William Shakespeare," prefixed to his edition of the poet's works, is sustained by independent tradition. It has been attacked with vigor and ingenuity by those who would fain have the world believe that the boy Shakespeare neither stole deer nor wrote coarse lampoons; but its credibility has never been materially impaired, and it is certainly supported by the sharp cut at Sir Thomas Lucy in the opening of the first scene of "The Merry Wives of Windsor." Shakespeare probably arrived in London in 1585 or 1586; the earlier date best according with all the facts and circumstances to be considered. He must soon have entered the theatre; and it is safe to assume that there he first sought employment. One tradition says that "he was received into the company at first in a very mean rank;" and another, that his earliest position was that of "a servitor," which is probable. Young players were then apprenticed; he would have been expected to begin as an apprentice; and apprentices were then called servants. Tradition also says that he began his London life by holding horses at the playhouse doors. This story has neither good authority, probability, nor concurrent testimony to support it. Be this as it may, his rise to eminence was rapid; though not as an actor, for he seems never to have risen above the position known on the French stage as "general utility." We are tolerably well in-

formed by contemporary writers as to the performances of the eminent actors of that time; but of Shakespeare's performances we read nothing. There is a tradition that he played the Ghost in his own "Hamlet;" and it is recorded by Oldys that one of his younger brothers, who lived to a great age, when questioned in his last days about William, said that he could remember nothing of his performances but seeing him "act a part in one of his own comedies, wherein, being to personate a decrepit old man, he wore a long beard, and appeared so weak and drooping, and unable to walk, that he was forced to be supported and carried by another person to a table, at which he was seated among some company, and one of them sung a song." If this story may be believed, we know that Shakespeare played "Adam" in "As You Like It." There is a tradition also that he played kingly parts, for which his fine person and graceful bearing fitted him. We learn from Ben Jonson's own edition of his comedies (folio, 1616) that Shakespeare played a principal part in "Every Man in his Humour" when it was first performed, in 1598, and also in "Sejanus" when it was brought out in 1603; but what characters he sustained in these plays we do not know. Shakespeare's pen seems to have been soon employed, but not at first in purely original composition. In his time there was an inordinate craving for new plays. Public taste was rapidly improving; and plays the subjects of which were popular were rewritten again and again to meet the demands of an advancing standard of criticism. Young lawyers and poets produced plays rapidly to meet the demand; but they could hardly satisfy it. Each theatrical company not only "kept a poet," but had 8 or 4, more or less, in its pay; and there was hardly a theatre which could not boast of as many of its actors who could write as well as play. There was a never ceasing writing of new plays and furbishing up of old ones. Two, three, and even half a dozen playwrights were employed upon one drama, when haste was necessary for the theatre, or when the junto needed money, which was almost always. It was upon this field of labor that Shakespeare entered; not seeking by it fame, but fortune; not consecrating himself to literature, but working for the wherewithal to return to the Stratford which he had left almost a fugitive, to live there like a gentleman, under the very noses of the Lucys. It has been generally believed that Shakespeare on his arrival in London joined at once the company which played at the Blackfriars theatre, known as the lord chamberlain's servants, and that he wrote for no other. But although there is no doubt that he soon became engaged with that company, and although it is quite possible that he never played in any other, there seems to be reason for believing that he began his career as a dramatist by writing in company with Robert Greene and Christopher Marlowe,

who were playwrights of established reputation before he had asked a hearing, and who wrote chiefly for a company known as the earl of Pembroke's servants. In conjunction with them he appears to have written a part of "The Taming of a Shrew," of "The First Part of the Contention betwixt the Two Famous Houses of York and Lancaster," and of "The True Tragedy of Richard Duke of York," which he afterward rewrote alone, and brought out as his own, as "The Taming of the Shrew" and the Second and Third parts of "King Henry VI." The facts and arguments on which this conclusion rests cannot be stated here; they will be found in Mr. R. Grant White's "Essay on the Authorship of the Three Parts of King Henry VI." He soon obtained that degree of eminence which insures the enmity of surprised, eclipsed, and envious contemporaries. The first public notice of him that has yet been discovered is the bitter sneer of an unworthy, dying, disappointed rival. Robert Greene, writing from the fitting deathbed of a groveling debauchee, warns three of his literary companions to shun intercourse with actors, whom he styles "puppits that speake from our mouths, those anticks garnisht in our colours." He goes on to say: "Yes, trust them not: for there is an upstart crow beautified with our feathers, that with his Tygres heart wrapt in a players hyde, supposes he is as well able to bombast out a blauke verse as the best of you; and beeing an absolute *Johannes Fac-totum*, is, in his owne conceyt, the onely Shake-scene in a cuntry." The allusion here to Shakespeare is unmistakable; the words "Tygres heart," &c., are slightly altered from a line which is found both in the "Third Part of King Henry VI.," and in "The True Tragedy;" and the former play is plainly indicated as one of those in which the upstart crow is beautified with the feathers of Greene and of the friends whom he addresses, Marlowe, Lodge, and Peele. The letter in which this exhortation occurs was published in 1592, shortly after the writer's death, under the direction of his friend Henry Chettle. It gave offence to Marlowe and Shakespeare, as we know from a pamphlet published by Chettle 3 months after, in which he says: "With neither of them that take offence was I acquainted, and with one of them [Marlowe] I care not if I never be; the other [Shakespeare] . . . I am as sorry as if the original fault had beene my fault, because my selfe have seene his demeanor nor lesse civill than he exlent in the qualitie he professes; besides divers of worship have reported his uprightness of dealing which argues his honesty, and his facetious grace in writting that approves his art." Thus we find Shakespeare at the age of 28, only between 6 and 7 years after his departure from Stratford, in possession of the regard of his equals, the respect of his superiors, the admiration of the public, and the consequent jealous hate of his inferiors. From this time forward to the end of his career in

London our knowledge of his life is confined almost exclusively to the production of his plays and poems; and the date at which these were written has in most cases to be inferred or conjectured. Before this time, in addition to his share in the old plays already named, and perhaps some others which are lost, including an older form of "The First Part of King Henry VI.," he had quite surely written "Titus Andronicus," "Love's Labor's Lost," "The Two Gentlemen of Verona," "The Comedy of Errors," and perhaps a part of an early and unpublished form of "Romeo and Juliet," and a part of "A Midsummer Night's Dream." In 1593 appeared his first published poem, "Venus and Adonis," in which the glow of youthful ardor is chilled, but not extinguished, by the cold and elaborate style in which, in imitation of the poets most in vogue at that time, he, going thus the way of all young authors, solicitously wrote. This poem is filled with evidences of an intimate knowledge and genuine love of nature, and aside from the attractiveness of its subject, it is not surprising that 5 editions of it were called for within 9 years. It was dedicated to the earl of Southampton, an amiable and accomplished nobleman, who loved literature and the drama, and encouraged men of letters, and even players. It is said that his kindness to Shakespeare went so far that the poet received from him £1,000 as a free gift. As this sum at that time was equal to about \$30,000 in America to-day, the amount has probably been much exaggerated, possibly by the addition of a cipher. Rowe, who first told this story, says that Southampton gave the money that Shakespeare "might go through with a purchase which he heard he had a mind to;" and it has been reasonably conjectured that this purchase was an interest in the company to which Shakespeare attached himself soon after his arrival in London, and in which he became a principal owner. Mr. John Payne Collier, the learned historian of the English stage, produced in 1835, as one of several of a similar nature which he had discovered among the MSS. of the earl of Ellesmere at Bridgewater house, a certificate dated "Nov'r 18, 1589," in which Shakespeare's name appears as the 12th in a list of 16 "sharers in the Blacke Fryers play-house." This document has been pronounced spurious by some of the most eminent and respectable palæographers and English scholars in England. If it is genuine, and Shakespeare was indebted to his noble patron for any share in the company, the dedication was an acknowledgment of the gift, and not the contrary. In any case we may be sure that the poem was written some years before it was printed; and it may have been brought by the young poet from Stratford in MS. and read by a select circle, according to the custom of the time, before it was published. In the dedication Shakespeare calls it "the first heir of his invention," and promises his patron to take advantage of all



idle hours until he has honored him with some graver labor—language which seems to indicate not only Southampton's consent to accept this work, but that he had already shown a friendly interest in the writer. In 1594 Shakespeare published "Lucrece," which he also dedicated to Southampton, saying: "The love I dedicate to your lordship is without end. . . . What I have done is yours; what I have to do is yours; being in part all I have devoted yours." This poem was quite surely written in 1593, and its style of thought shows that its writer had had the benefit of the maturing effect of several years since the production of "Venus and Adonis." Between 1592 and 1596 Shakespeare probably wrote, and in this order, "Richard III.," "All's Well that Ends Well" (which seems to have been first called "Love's Labor's Won"), "A Midsummer Night's Dream" in its latest form, "King Richard II.," and "The Merchant of Venice." With the two last named plays begin the indications of that mental development of their author which has been called "the middle period" of his genius. "King John," the rewritten "Romeo and Juliet," "The First and Second Parts of King Henry IV.," "The Merry Wives of Windsor," "As You Like It," "Much Ado about Nothing," "King Henry V.," "Twelfth Night," and "Hamlet" (founded probably upon an older play) seem to have succeeded each other rapidly from 1596 to 1600 inclusive—a rich yield of 5 years, but this was Shakespeare's most productive period. "The Second Part of King Henry IV." is perhaps the most complete existing presentation of his many-sided genius. It is surpassed in some one regard by several of the comedies and tragedies; but in no other single play does the supremacy of his powers as poet, dramatist, philosopher, wit, and humorist so manifestly appear. It is in this history that the character of Falstaff attains its highest development. The great tragedies were the fruit of the first decade of the 17th century. As several of them were not printed until the publication of their author's collected works after his death, the order of their production is not easily determinable. They, with two comedies, were probably produced in the following order: "Troilus and Cressida," "The Taming of the Shrew," "Measure for Measure," "Othello," "King Lear," "Macbeth," "Julius Cæsar," "Antony and Cleopatra," "Coriolanus," but the last named tragedy was not improbably written after 1610. "King Lear," the grandest exhibition of its author's genius, may be safely attributed to the year 1605, when Shakespeare was 40 years of age. Between 1610 and 1613 "Cymbeline," "Timon of Athens," "The Winter's Tale," "The Tempest," and "King Henry VIII." were produced; and about the latter year Shakespeare ceased to write. It is remarkable that among his very latest productions were two plays, in one of which, "The Tempest," he preserves the uni-

ties of time and place with classic tenacity, while in the other, "The Winter's Tale," he sets them at naught with a recklessness which has no parallel even in his pages. "Pericles," published in his lifetime as his, shows marks of his latest style, which increase in frequency toward its close. It is doubtless the work of another hand which he undertook to embellish. Of "The Two Noble Kinsmen," published in 1634 as by Fletcher and Shakespeare, there can be hardly a question that he was in part the author; but it was probably an old play to which he made additions, and to which again Fletcher, after Shakespeare's death, put a modifying hand. In addition to the works which have been enumerated, he wrote "A Lover's Complaint," a very charming amatory elegy, which bears the marks of his style in the earlier part of his "middle period;" some minor pieces, which were embodied in a miscellany called "The Passionate Pilgrim;" and his sonnets. These sonnets, though deformed with occasional conceits, far surpass all other poems of their kind in our own language, or perhaps in any other, and would have won their author an immortal name had he written nothing else. It is only in the sun-like splendor of his dramatic poetry that their feeble light is paled. To whom they were written, and in whose person, is among the most difficult of unsolved literary problems. They were published in 1609 with a dedication by the publisher to a "Mr. W. H.," whom he styles their "onlie begetter;" and who this begetter was no man has yet been able satisfactorily to show. Most of them are addressed in terms of the warmest endearment to a beautiful young man; many of them reproach, in the words of a man who is wroth with one he loves, a beautiful and faithless woman; a few belong to the class called "occasional." It has been ingeniously argued by Mr. Bowden that the gentleman so unceremoniously addressed by a bookseller as Mr. W. H. was William Herbert, earl of Pembroke; but Chalmers had almost as much reason for his notion that he was Queen Elizabeth in doublet and hose. Conjecture upon this subject has been various and futile; and it has been reasonably supposed, in the words of the Rev. Alexander Dyce, one of the most accomplished, learned, and candid of Shakespeare's commentators, that "most of them were composed in an assumed character, on different subjects and at different times, for the amusement, if not at the suggestion, of the author's intimate associates." This opinion as to the origin of these beautiful and mysterious compositions is sustained by the phrase, "sugred sonnets among his private friends," applied to them by Francis Meres in his "Palladis Tamia," published in 1598. But the sonnets themselves forbid us to accept this theory as satisfactory. Whatever their occasion may have been, some of them give us glimpses deep down into Shakespeare's heart of hearts.—Meagre as this record is compared with the eminence of its

subject, we have nearly approached the limits of our knowledge of Shakespeare's life. Almost 100 years ago George Steevens wrote: "All that is known with any degree of certainty concerning Shakespeare is, that he was born at Stratford-upon-Avon, married and had children there; went to London, where he commenced actor, and wrote poems and plays; returned to Stratford, made his will, died, and was buried." The assiduous researches of a century have discovered little more than this. The antiquaries have found his name in a few public documents and private letters, telling of the purchase of lands and tithes, the leasing of houses, and the borrowing of money; but what do such trivial and barren facts tell us of the life of him who wrote "Hamlet," "King Lear," "Macbeth," "Othello"? The notion for a long time prevailed, and to a certain extent still prevails, that Shakespeare was unappreciated and neglected in his lifetime, and owes his fame to the discovery of his genius by his posthumous critics. The fact is quite otherwise. We have seen what his reputation was both as an author and a man in 1592. His "Venus and Adonis," published in the next year, had run through 5 editions by 1602. Both it and "Lucrece" are highly extolled by contemporary writers. Spenser himself alludes to him in "Colin Clout," written in 1594, as one

Whose muse, full of high thought's invention,  
Doth like himselfe heroically sound.

Francis Meres, in his "Palladis Tamia," published in 1598, when Shakespeare was 34 years old, said that "the sweete wittie soul of Ovid lives in mellifluous and honey-tongued Shakespeare; witness his 'Venus and Adonis,' his 'Lucrece,' his sugred sonnets among his private friends." "As Plautus and Seneca are accounted the best for comedy and tragedy among the Latines, so Shakespeare among the English is the most excellent in both kinds for the stage." And this was before his greatest works were written. Meres adds: "As Epilus Stolo said that the Muses would speake with Plautus' tongue, if they would speake Latin, so I say that the Muses would speake with Shakespeare's fine filed phrase if they would speake English." We know, too, that his plays were as attractive to the public as they were satisfactory to those critics who were not his rivals. Leonard Digges, born in 1588, tells us, in verses not published until 1640, that when the audience saw Shakespeare's plays they were ravished and went away in wonder; and that, although Ben Jonson was admired, yet when his best plays would hardly bring enough money to pay for a sea-coal fire, Shakespeare's would fill "cock-pit, galleries, boxes," and scarce leave standing room. Wealth was the sure result of such success; and so we find that as early as 1597 he had bought a fine mansion in his native town, built originally by Sir Hugh Clopton in the reign of Henry VII., and known as "the great house," and afterward as New Place. It was the largest and best house in Stratford,

and as such, when in the possession of Shakespeare's granddaughter, Mrs. Nash, afterward Lady Barnard, was occupied by Queen Henrietta Maria in 1643, during the civil war. In 1597, also, Shakespeare opened a negotiation for the purchase of a part of the lease of the tithes of Stratford, which however was not perfected for some years, when he invested a sum equal to about \$13,000 in this public security. He otherwise increased in substance, and, like his own "Justice Shallow," had "land and beeves." In 1596 John Shakespeare obtained from the heralds' college a "confirmation" of an alleged previous grant of arms, in which confirmation it is said that the grantee's "parents and late antecessors" "were for their valiant and faithful services advanced and rewarded of the most prudent prince Henry the Seventh." But no record of such advancement, or of the original grant of arms, has been discovered; and as these allegations were true of William Shakespeare's "antecessors" on the mother's side, it has been reasonably conjectured that the "confirmation" of arms was applied for by John Shakespeare at the instance, and procured by the influence, of his thriving and much admired eldest son. Tradition tells us that Shakespeare's memory clung to Stratford in the midst of his metropolitan triumphs and successes, and that he visited his family once a year. His townsmen respected and looked up to him, and in some cases leaned confidently upon his good offices in the way of influence and the advancement of money. We know nothing of his intercourse with actors and men of letters in London, save that he won gruff Ben Jonson to say in his "Discoveries": "I loved the man, and do honor his memory on this side idolatry as much as any." And indeed, according to the tradition furnished by Betterton to Rowe, Jonson was indebted to Shakespeare for the reception and performance of his first play at the Blackfriars theatre. It had been tossed aside as the production of an unknown writer, when Shakespeare read, admired, and recommended it. Fuller says in his "Worthies" that the two friends had many "wit combats" together, in which he compares Jonson to "a Spanish great galleon," "solid but slow in his performances," and Shakespeare to an "English man-of-war, lesser in bulk but lighter in sailing." It has been supposed that these encounters took place at the Mermaid tavern, where a club met of which Sir Walter Raleigh had founded, and of which Jonson, Beaumont, Fletcher, Selden, Donne, and others of their sort were members. Unfortunately there is no evidence whatever to show that Shakespeare ever met with this club; but it is extremely improbable that he was not a member of it. There is a tradition that King James was so much his admirer that he wrote him "an amicable letter" in autograph. It is not very improbable that James should have done so; and there is evidence of some weight to show that the letter was in the possession of

Sir William D'Avenant, although at the beginning of the last century it had been lost.—Shakespeare is supposed to have abandoned the stage about 1604, and to have returned to Stratford to live at some time between 1610 and 1618. No record or noteworthy tradition of any event of importance or interest in this part of his Stratford life has reached us. Rowe says that he spent it "in ease, retirement, and the conversation of his friends," who were "the gentlemen of the neighborhood." We have no account of the manner of his death except the following entry in the diary of the Rev. John Ward, who was appointed vicar of Stratford in 1662, nearly 50 years after the event to which it relates: "Shakespeare, Drayton, and Ben Jonson had a merie meeting, and it seems drank too hard, for Shakespeare died of a feavour there contracted." It is not impossible that this piece of gossiping tradition is true; and those who like to believe it may do so. Shakespeare was buried on the second day after his death, on the north side of the chancel of Stratford church. Over his grave there is a flat stone with this inscription, said to have been written by himself:

Good frind for Iesus sake forbear:  
To digg the dust enclosed heare:  
Blest be y<sup>e</sup> man y<sup>e</sup> spares thes stones,  
And curst be he y<sup>e</sup> moves my bones.

By whomsoever these lines were written, they have happily been effectual in keeping at Stratford what might otherwise have been carried to Westminster. Against the north wall of the chancel is a monument which was erected before 1623, and in which the poet's bust appears under an arch; his right hand holds a pen, and he appears to be in the act of writing upon a sheet of paper placed on a cushion before him. This bust, which is of life-size, was originally colored after nature. The eyes were of light hazel, the hair and beard auburn. The same Rev. Mr. Davies who records his "unluckiness touching deer and rabbits," also writes that "he died a papist;" but, considering the extreme puritanical notions then prevalent, a very moderate degree of high churchmanship would be likely to be stigmatized among the people as papistry, especially in an actor. His works are imbued with a high and heartfelt appreciation of the vital truths of Christianity, without leaning toward any form of religious observance or of church government, or any theological tenet or dogma. His character seems to have been one of singular completeness, and of perfect balance. An actor at a time when actors were held in the lowest possible esteem, he won respect and consideration from those who held the highest rank and station; a poet, he was yet not only thrifty but provident. Surpassing all his rivals among his social equals, he was, after the recoil of the first surprise, loved by all of them. "Sweet" and "gentle" are the endearing epithets which they delighted to apply to him. In his position, to produce this effect upon high and low, he must have united a native dignity to a singular

sweetness of temper and graciousness of manner. His integrity was early noticed, as already has been remarked; and Jonson, in his "Discoveries," says he was "indeed honest, and of an open and free nature." More than this we do not know of him; but this is much. In person he appears to have been no less agreeable than in mind. Aubrey heard that he was "a handsome, well shapt man." With this report the bust at Stratford, and the portrait engraved by Droeshout for the first collected edition of his works, agree. They are the only existing authentic portraits of him; and hard and poorly drawn as the latter is, there is a conformity between the two which sustains the authenticity of both. Both show a somewhat unusual length of upper lip; otherwise the features are remarkably well shaped and proportioned, and the head is large and symmetrical.—Such brief criticism as could be here passed upon his works would be superfluous, almost impertinent. By the voice of the whole civilized world his name is "the first in all literature;" in imagination, in fancy, in knowledge of man, in wisdom, in wit, in humor, in pathos, in strength, in versatility, in felicity of language, in the music of his verse, and in that mysterious power which fuses all these separate powers into one, and makes them a single means to a single end, he stands alone, unapproached, and seeming unapproachable. According to the custom of his time, his dramas were founded upon others, the subjects of which were favorites with the public, or upon popular tales, or passages in history. But in the interweaving of two stories into one plot (as in "The Merchant of Venice") and in the elaboration of a bald and barren subject, he exhibited a constructive faculty not inferior to his other gifts. He did not hesitate to avail himself of the very language of the chronicler or novelist to whom he went for incidents; but in passing through his mind it was transformed from perishable prose into imperishable poetry. His chief excellence is in the unity and consistent action of his characters. He gave each one an individual soul; they speak their own thoughts and feelings, not his. In this respect his power seems almost supernatural.—Unlike Dante, unlike Milton, unlike Goethe, unlike the great poets and tragedians of Greece and Rome, Shakespeare left no trace upon the political or even the social life of his era. Among his contemporaries and countrymen were Raleigh, Sidney, Spenser, Bacon, Coke, Camden, Cecil, Hooker, Drake, and Inigo Jones; and yet there is no evidence, even traditionary, that he had any acquaintance with either of these men, or with any others of less note among the statesmen, scholars, soldiers, or artists of his day. In making his will Shakespeare left his wife (who survived him 7 years), by an interlined bequest, only his "second best bed with the furniture." This looks like a slight; but his wife was amply provided for by her dower right, and the knowledge of this

might very probably cause him to pass over her at first unnamed. Yet in a will containing so many small bequests, the interlineation of a wife's name cannot but be regarded as evidence of some lack of consideration. His family became extinct in the third generation. His son Hamnet died in 1596 at the age of 11 years. His elder daughter married a physician, Dr. John Hall, to whom she bore one daughter, who married Thomas Nash, and after his death Sir John Barnard, and died childless (1670). His second daughter, Judith, married Thomas Quiney, and had 3 children, who all died without issue. Upon the death of Lady Barnard, New Place was sold. It passed again into the hands of a Sir Hugh Clopton, and finally became the property of the Rev. Francis Gastrell, who in 1759, having quarrelled with the town magistrates about assessments, razed the building to the ground, after having in 1756 cut down the mulberry tree planted by Shakespeare, because he was annoyed by the pilgrims who came to visit it. The house in Henley street has at last been purchased by an association which has had it restored as far as possible, and placed it in the hands of proper keepers.—Of Shakespeare's 37 plays, 17 were printed separately in quartos, in almost every instance, it would appear, without his coöperation, and in many instances from copies surreptitiously obtained. The text of most of these quarto copies is very corrupt and imperfect. In 1623 two of his fellow actors, John Heminge and Henry Condell, superintended the publication of the first collected edition of his "Comedies, Histories, and Tragedies," from which however "Pericles" was omitted. This volume, known as the first folio, contains the only authentic text of Shakespeare's plays. But its authority is grievously impaired by the careless manner in which it was printed, and by the fact that in some cases it was put in type from the surreptitious and imperfect quartos which it was intended to supersede, and the errors of which it not infrequently perpetuates; but it corrects vastly more than it makes and repeats, and it supplies serious deficiencies, although it leaves some to be supplied. Plainly, too, most of the quarto copies from which it was printed had been used as stage copies by Shakespeare's company, and thus received many corrections which were at least *quasi* authoritative. Of the text of 20 of the plays it is the only source. In 1682 a 2d edition of the collected plays appeared. It corrected the text of its predecessor in a few passages, corrupted it in many, and modernized it in some. It is of no authority. A 3d edition appeared in 1664 (some copies are dated 1668), which is chiefly noticeable from its containing "Pericles" (as to which see above), and 6 spurious plays attributed to Shakespeare by booksellers in his lifetime, but rejected by his friends and fellow actors—"The London Prodigal," "Thomas Lord Cromwell," "Sir John Oldcastle," "The Puritan Widow," "A Yorkshire Tragedy," and "Locrine." A 4th folio was

published in 1685. The text of Shakespeare's works, excepting his poems, was left in so corrupt a state by the early printers, that, the author's manuscripts having perished, it needed much editorial care to bring it even into a tolerably sound condition. This subject has engaged the attention of critics and scholars for a century and a half, and has produced a literature in which much learning, ingenuity, and philological and even philosophical speculation are mingled with ignorance, stupidity, frivolity, and bad temper. When to the works of the editors and textual critics are added those of the philosophical and the exegetical, and the illustrators, we have a library in itself. The best index to Shakespearian literature yet published is that of P. H. Sillig (8vo., Leipsic, 1854); but this is often incorrect, and is imperfect even up to its date; while that published by J. O. Halliwell (London, 1841) is very incomplete. The impressions of Shakespeare's works are countless. The editions which, for their text or comments, are worthy of notice are: Nicholas Rowe's (7 vols. 8vo., London, 1709), the first in which the text was submitted to collation and revision; Alexander Pope's (6 vols. 4to., London, 1725), probably the worst ever published; Lewis Theobald's (7 vols. 8vo., London, 1733), in which a great advance was made in the rectification of the text; Sir Thomas Hanmer's (6 vols. 4to., Oxford, 1744); Bishop Warburton's (8 vols. 8vo., London, 1747); Dr. Johnson's (8 vols. 8vo., 1765), the value of which is in inverse proportion to the reputation of its editor; Edward Capell's (10 vols. 8vo., London, 1768), most laboriously and carefully edited, but with little judgment or taste; Johnson's edition with additional notes by George Steevens (10 vols. 8vo., London, 1773); the same with additional notes by Isaac Reed (15 vols. 8vo., 1785); Edmund Malone's edition, a most important one (10 vols. 8vo., 1790); Isaac Reed's, an enlargement of that of 1785, with the notes and readings of various commentators, commonly called the first *variorum* (21 vols., London, 1818); Malone's 2d edition, completed and superintended after his death by James Boswell jr. (21 vols., London, 1821), "the" *variorum*; Samuel Weller Singer's (10 vols. fcp. 8vo., Chiswick, 1826), an edition marked by all the traits of the critical school of the last century, but very popular from its beauty of typography, and its judicious selections from the notes of previous editors. Much had thus far been done to correct and illustrate the text of Shakespeare; but it had suffered almost as much from the presumption, the perverseness, and the narrow precision of his editors and commentators, as it had profited by their laborious investigation of the literature and the manners of his time. The critical spirit of the last century was narrow and oppressed with deference to classical models. The authoritative position of the first folio was little regarded; and its readings were set aside without cause as well as with cause, at the caprice of

the editor. But the minds of men had come more and more under the influence of Shakespeare's genius. It was found that he was not to be judged by the standards of the schools, but that he was a law unto himself. During the first quarter of the present century there was a growing dissatisfaction with the results of the editorial labor of the last upon the works of Shakespeare. The result was a new school of commentators and new editions of the plays. First in point of time, and profoundest in deference to the first folio, was the pictorial edition of Mr. Charles Knight (8 vols. 8vo., London, 1839-'41). This was the extreme recoil of the pendulum. It was immediately followed by the edition of Mr. John Payne Collier (8 vols. 8vo., London, 1841-'4). Mr. Collier worked in the spirit of an antiquary rather than a critic, and made much of readings derived from the rarest and most inaccessible quarters. He opposed conjectural emendation with a bigotry which rivalled Mr. Knight's Quixotic championship of the first folio, and often set reason at naught in favor of "the oldest authority." A judicious eclectic use was made of the labors of Mr. Knight and Mr. Collier by Gulian C. Verplanck, LL.D., who prepared an edition (8 vols. 8vo., New York, 1847), to which he contributed a large amount of original matter distinguished for soundness of judgment and elegance of taste. An edition published under the direction of the Rev. H. N. Hudson (12 vols. 16mo., Boston, 1851-'6) is noticeable chiefly for the true appreciation, subtle thought, and manly vigorous style of the essays introductory to each play. In 1853 Mr. J. O. Halliwell commenced the publication of a stupendous edition, in 20 vols. folio, which is intended to present all of interest that has been discovered or written for the illustration of Shakespeare down to the present day. This great undertaking has thus far reached only the 10th volume. Mr. Halliwell has not done much for the correction of the text; and the same is true of Mr. Howard Staunton's pictorial edition, in which much of Mr. Knight's matter has been used. One of the most judicious editions ever published is that of the Rev. Alexander Dyce (6 vols. 8vo., London, 1857); but even Mr. Dyce has left his page spotted with numerous corruptions. The edition of Mrs. Mary Cowden Clarke (2 vols. 8vo., New York, 1860) gives the text very carefully and judiciously. The last edition prepared from a new recension and collation of the text is that of Mr. R. Grant White (12 vols. crown 8vo., Boston, 1857-'62), which seeks to present the reader with all that is necessary to a critical study of the poet, and which is distinguished by its numerous and successful restorations of corrupted passages.—Of the books written upon Shakespeare's life, text, and genius, forming a mass of which a very imperfect record of the mere titles fills 89 8vo. pages in Sillig's book, mentioned above, only a few of the most noteworthy can be indicated here. "A short View of Tragedy; its original

Excellency, and Corruption, with some Reflections on Shakespeare and other Practitioners for the Stage," by Thomas Rymer (8vo., London, 1693), is noticeable only as being the first book on this subject. But Dryden in his "Essay of Dramatic Poesy" (1668), and in the prefaces to "The Tempest" (1670) and "Troilus and Cressida" (1679), and the defence of the epilogue to "The Conquest of Granada" (1672), and Lambaine in his "Account of the English Dramatic Poets" (1691), had previously criticized Shakespeare's plays, the former very elaborately. Of subsequent critical works these are worthy of particular remark: "Shakespeare Restored, or Specimens of Blunders committed and unamended in Pope's Edition of this Poet," by Lewis Theobald (4to., London, 1726); "Miscellaneous Observations on the Tragedy of Macbeth, with Remarks on Sir T[homas] H[anmer's] Edition of Shakespeare; to which is affixed Proposals for a new Edition of Shakespeare with a Specimen," by Samuel Johnson (12mo., London, 1745); "Critical Observations on Shakespeare," by John Upton (8vo., London, 1746 and 1748); "The Canons of Criticism," by Thomas Edwards (London, 1748, and, with additions, 1765); "Notes and Various Readings of Shakespeare," by Edward Capell (4to., London, 1759, and, with important additions and "The School of Shakespeare," 3 vols. 4to., 1779-'80); "A Revision of Shakespeare's Text," by Benjamin Heath (8vo., London, 1765); "An Essay on the Learning of Shakespeare," by Richard Farmer, D.D. (8vo., London, 1767, and, greatly enlarged, Cambridge, 1767); "Twenty of the Plays of Shakespeare, being the whole number printed in Quarto during his Lifetime, or before the Restoration; collated where there were different copies, and published from the originals," by George Steevens (4 vols. 8vo., London, 1766); "Six Old Plays on which Shakespeare founded 'Measure for Measure,' 'Comedy of Errors,' 'Taming the Shrew,' 'King John,' 'King Henry IV.,' 'King Henry V.,' and 'King Lear,'" (2 vols. 12mo., London, 1779); "Comments on the Last Edition of Shakespeare's Plays," by John Monck Mason (8vo., Dublin, 1785); "A Dissertation on the Three Parts of Henry VI.," by Edmund Malone (London, 1792); "A Specimen of a Commentary on Shakespeare, containing: 1st, Notes on 'As You Like It;' 2dly, An Attempt to explain and illustrate various Passages on a new Principle of Criticism derived from Mr. Locke's Doctrine of the Association of Ideas," by Walter Whiter (8vo., London, 1794); "An Apology for the Believers in the Shakespeare Papers which were exhibited in Norfolk Street, London," by George Chalmers (8vo., London, 1797), and "A Supplemental Apology for the Believers in the Shakespeare Papers" (1799; these volumes, with "An Appendix" published in 1800, in spite of the speciality of their titles, are filled with general comment and the results of careful investigation); "Illustrations of Shake-

speare and of Ancient Manners," &c., by Francis Douce (2 vols. 8vo., London, 1807); "Characters of Shakespeare's Plays," by William Hazlitt (London, 1817); *Vorlesungen über dramatische Kunst und Literatur*, by August Wilhelm Schlegel (3 vols. 8vo., Heidelberg, 1817; translated by J. Black, London, 1818); "Shakespeare and his Times," by Nathan Drake, M.D. (2 vols. 4to., London, 1817); "A Glossary, or a Collection of Words, Phrases, Names, and Allusions to Customs, Proverbs, &c., which have been thought to require Illustration in the Works of English Authors, particularly Shakespeare and his Contemporaries," by Archdeacon Nares (4to., London, 1822; and edited by J. O. Halliwell and Thomas Wright, 2 vols. 8vo., 1859), a learned and accurate work; *Shakespeare's Vorschule*, edited, and accompanied with prefaces, by Ludwig Tieck (2 vols. 8vo., Leipsic, 1823 and 1829); "New Facts regarding the Life of Shakespeare," by J. P. Collier (8vo., London, 1835); "New Particulars regarding the Works of Shakespeare," by the same (8vo., London, 1836); "On the Sonnets of Shakespeare, identifying the Persons to whom they are addressed, and elucidating several points in the Poet's History," by James Boaden (8vo., London, 1837); *Ueber Shakespeares dramatische Kunst und sein Verhältniss zu Calderon und Goethe*, by H. Ulrici (8vo., Halle, 1839; translated, 8vo., London, 1846); "Shakespeare's Library, a Collection of the Stories, Novels, and Tales used by Shakespeare as the Foundation of his Plays," edited by J. P. Collier (8vo., London, 1840-41); "Remarks on Mr. J. P. Collier's and Mr. Charles Knight's Editions of Shakespeare," by the Rev. Alexander Dyce (8vo., London, 1844); *Shakespeare et son temps, étude littéraire*, by François Guizot (8vo., Paris, 1852); "The English of Shakespeare," by George L. Craik (12mo., London, 1857); "A Critical Examination of the Text of Shakespeare," by Wm. Sidney Walker (3 vols. 16mo., London, 1860). The multitudinous publications of the Shakespeare society of London contain, among much that is either trivial, or mere antiquarian rubbish, many volumes of valuable and well edited reprints of scarce old plays, of dramatic history, and of critical suggestions for the improvement of the text of Shakespeare.—Eminent among the philosophical critics of Shakespeare is Samuel Taylor Coleridge, who by his lectures and by his essays (see his "Friend" and his "Literary Remains") did more perhaps than any other one writer to bring about a profound and thoughtful appreciation of the poet's works. Mrs. Jameson's "Characteristics of Women, Moral, Poetical, and Historical" (2 vols. 8vo., London, 1832), as a minute and sympathetic analysis of Shakespeare's principal female characters, must ever rank high in this department of literature. The Rev. H. N. Hudson's "Lectures on Shakespeare" (2 vols. 12mo., New York, 1843) are remarkable for the same qualities which appear in a higher degree in the essays in his edition of the works above

noticed. Mr. R. Grant White, in "Shakespeare's Scholar" (8vo., New York, 1854), published historical and critical studies of the poet's text, characters, and commentators, and an examination of Mr. Collier's folio of 1632, the conclusions of which were sustained by discoveries made in England five years afterward.—In 1852 Mr. J. P. Collier, who had previously brought forward many documents of ancient date in relation to Shakespeare as the fruits of his researches, announced that he had become the possessor of a copy of the second folio edition of Shakespeare's plays (1632), which from the first page to the last contained "notes and emendations in a hand not much later than the time when it went to press." He published in 1853 a history of his acquaintance with this volume, and detailed accounts, accompanied with comment, of its most plausible marginal changes in the text: "Notes and Emendations to the Text of Shakespeare's Plays, from early Manuscript Corrections in a copy of the Folio, 1632, in the Possession of J. Payne Collier, F. S. A." (8vo., London). The sensation caused by this publication was widespread and profound. The majority of readers hailed it almost as a revelation from the tomb of Shakespeare himself; and it seemed for the moment as if all previous editions of his works had become waste paper. A small minority doubted and wondered; and a few stoutly protested. The critics on the one hand supported it enthusiastically, and on the other attacked it vigorously. It was found that the bulk of its corrections had been anticipated by the conjectural emendations of editors and verbal critics; and of the comparatively small remainder, there were very few which commanded the general assent of English scholars and students of Shakespeare. It was shown first in a paper in "Putnam's Magazine" (New York) for Oct. 1853, that the corrections, upon their own evidence, were made at so late a date as to have no authority from their antiquity. The folio having been placed for a time in the British museum, certain officers of that institution, including the eminent palaeographer, Sir Francis Madden, superintendent of the manuscript department, pronounced its marginal corrections spurious imitations of ancient handwriting, and announced that they had discovered partially erased guides in pencil, in modern handwriting, for the antique-seeming words in ink, and that in many instances the modern pencil writing appeared under that in ink, which professed to be more than 200 years old. Upon this announcement, in July, 1859, in the London "Times," a fierce discussion arose, which continued for two years and more. It had for its subject not only the notorious folio, but all the manuscripts which Mr. Collier had brought to the notice of the public as containing contemporary notices of Shakespeare or his works, nearly all of which were pronounced forgeries by the same high authorities which condemned the folio. So extensive and so impor-

tant a literary fraud had never before been detected. Toward the end of the last century a scapegrace named William Ireland professed to have discovered miscellaneous papers and legal instruments under the hand and seal of William Shakespeare, which were outrageous forgeries; but they were palpably spurious, and were quickly detected, although they deceived many men of erudition for a time. The result of the examination and discussion in Mr. Collier's case has been to leave him with a damaged reputation both for judgment and veracity, his folio without a semblance of authority, and his manuscripts under the gravest suspicion, at the very least; although his accusers have not succeeded in making out all their case. The bulk of the corrections in this folio seem to have been made about 1675; but there is evidence which goes strongly to show that Mr. Collier is responsible for some of them. See "An Inquiry into the Genuineness of the Manuscript Corrections in Mr. J. Payne Collier's Annotated Shakspeare Folio, 1632, and of certain Shaksperian Documents likewise published by Mr. Collier," by N. E. S. A. Hamilton (4to., London, 1860); Mr. Collier's "Reply" to this volume (London, 1860); "A Complete View of the Shakspeare Controversy," &c., by C. Mansfield Ingleby, LL.D., with numerous facsimiles (8vo., London, 1861); and a thorough examination of the whole subject in "The Shakespeare Mystery," an article in the "Atlantic Monthly" (Boston) for Sept. 1861. The Germans have taken a lively interest in this discussion; and indeed Shakespeare is appreciated as highly, and for 50 years has been almost as assiduously studied in Germany as in Great Britain and America. But there is no sufficient ground for the assertion sometimes made that the Germans taught the English race to understand its own great poet. Shakespeare's works have been translated into all the languages of the civilized world, but best into German. The version of Schlegel and Tieck, which has been often reprinted, is probably the most perfect transfusion of thought from one form into another that ever was accomplished. No adequate French translation has yet appeared. Three of importance have been made: the first by Le Tourneur (1776-'82), in which the poet's thought is often ludicrously perverted; the next by Francisque Michel (1839-'40); and the third by François Victor Hugo (1859-'61). Of these, the second is the most faithful and scholarly.—Shakespeare's name is found in the manuscripts of his period spelled with all varieties of letters and arrangement of letters which express its sound or a semblance of it; but he himself, and his friend Ben Jonson, when they printed the name, spelled it Shakespeare. In this form, too, it is found in almost every book of their time in which it appeared. Therefore, although he sometimes wrote it Shakspeare, there seems to be no good reason for deviating from the orthography to which he gave a sort of formal recognition.

SHALE (Ger. *schälen*, to peel, to split), a rock composed of clayey sediments consolidated in layers which are fissile like the original clay, but not often divisible into smooth sheets like the argillaceous slates. Beds of shale are common throughout the range of the secondary rocks, and constitute a large portion of some of the formations. They alternate with the sandstones and other strata of these formations, and in the coal measures are abundant in beds blackened by the carbonaceous matters intermixed with the clayey sediments. In the red sandstone groups they are commonly also red from the oxide of iron they contain, and in other formations they are olive, and sometimes green and variegated. In texture they are soft and earthy, and are easily worn down into a muddy powder. By intermixture of carbonate of lime they become calcareous, and as the proportion of this increases they pass from calcareous shale to argillaceous limestone. Sand renders them arenaceous, and with excess of it they become sandstones. Carbonaceous matter renders them bituminous, and when the proportion is large the material becomes combustible and is used for some of the purposes of coal. Shales of this character are valuable for the oil that may be distilled from them. (See COAL, vol. v. p. 382, and the account of the manufacture of coal oil in PETROLEUM.)

SHAMANISM (Sanskrit, *shama*), a religion akin to Buddhism and Lamaism, prevalent in northern and eastern Asia, in Mongolia, Siberia, and parts of China. It has been called the old heathenism of Mongolia, but is probably of Indian origin. About 295 B. C. Megasthenes, the ambassador from Seleucus I. of Syria to Chandragupta, reported the philosophers of India to be of two classes, the Brakmans and the Samans, and ascribed to the most famous of the latter ascetic habits and priestly functions resembling those of the modern Shamans. Shamanism is a mixture of fetich and spirit worship, in which mysterious powers are attributed to the heavenly bodies, mountains, rivers, caves, elements, and any tree, stone, animal, or other object that exhibits peculiar form or properties, and in which good and bad genii, domestic and guardian divinities, and the ghosts of ancestors are believed to influence natural phenomena and human life, health, and fortune. Numerous symbols represent the objects of worship. Rude images of ancestors are made of wood, metal, felt, or linen, and preserved, attached to the tents, and sacrificed to as the especial protectors of households and flocks. The priests are a class of sorcerers, affecting a peculiar intimacy with spirits, working themselves into states of trance and epilepsy, pretending to powers of conjuring and exorcising, of magic and prophecy, and exerting great influence both as spiritual advisers and physicians. Nothing important is undertaken without consulting them. There are etymological indications that Shamanism early came into connection and conflict with Zoroastrianism.



It was the religion of the Mongols until the reign of Genghis Khan, but his successors favored Lamaism, which they received from Tibet, and which became the recognized faith of the court on the accession of Kublai Khan (about A. D. 1260). There was, however, a speedy relapse into Shamanism, which again prevailed for two centuries among the Mongols, till in 1577 they followed their sovereign Altan Khakan back into the Lamaic fold. But Shamanism still gives its own name and some peculiar features to the Mongolian Lamaism.

SHAMYL (SAMUEL), a prophet and sultan of the mountaineers of the Caucasus, born at Aul Himry, in northern Daghestan, about 1797. It is related that from childhood he was proud and ambitious, and excelled alike in mental capacity and athletic sports. He received the instructions of the mollah Jemal-Eddin, whose daughter became his favorite wife, and manifested a decided preference for the doctrines which were soon developed into Muridism. This system of fervid mysticism, founded on Soofeeism, was preached in 1823 by the prophet Kasi-Mollah, and quickly united the native tribes, who had long been at feud, in common hatred against the northern infidels. Kasi-Mollah and most of his adherents were slain by the Russians at Himry, Oct. 30, 1832; and Shamyl, who had taken a leading part in the rebellion, was wounded, and escaped alone through the ranks of the enemy to the camp of Hamsad Bey, the new leader of the Murids. On the death of Hamsad Bey in 1834, Shamyl was chosen to succeed him as head of the sect, being preferred for his genius and devotion to rivals of higher birth and rank. A schism at first weakened his authority; an expedition to Avares failed; but, having organized the conflicting tribes into a sort of theocracy, he inflicted upon Gen. Ivelitch in 1837 the severest defeat yet sustained by the Russians in the Caucasus, and forced Gen. Hafi into a retreat more disastrous than a lost battle. The Russians thus learned to appreciate his energy and resources; the czar Nicholas visited the Caucasus; and the mountaineers were enclosed upon every side. Shamyl hastened from point to point, harassing the Russian columns, until in 1839 he was besieged by Gen. Grabbe in the fortified post of Akulgo, on the inmost mountain range of Daghestan. On the third attempt the fortress was carried by storm; it was destroyed, and its defenders captured or slain; and as Shamyl was not to be found, and the Russians held all the communications of the place, they supposed that he had been buried beneath the ruins. Even the Murids believed him lost, till he suddenly appeared again among them, preaching with renewed zeal the holy war. This second escape strengthened their faith in his divine mission, and the whole country from the Soonia to the Koisoa rallied with enthusiasm to his standard. In 1843 he descended from the mountains with resistless power, conquered all Avares, besieged

ed Mozdok, and broke the connection between Derbend and the north. The campaign of the Russian general Neidhardt in the following year was a series of failures; Daniel Bey and other chieftains in the Russian army abandoned him; and the supremacy of the czars in the Caucasus was in jeopardy. Shamyl now, at the height of his power, completed the organization of his government. Dargo was made the capital. The civil laws were founded chiefly on the Koran; the criminal code affixed the severest penalties to cowardice in battle, and a military order of merit was founded. The finances were provided for by a regular system of taxation, and communication between the provinces by messengers on horseback was established. Five years from Shamyl's supposed destruction at Akulgo his authority extended over a population scarcely less than 1,000,000. In 1845 the czar renewed the war with greater energy. Prince Woronzoff, marching to besiege Dargo, reached the town only to find it abandoned, and having destroyed it effected a disastrous retreat, harassed by the Murids. Meantime Argutinsky expelled the troops of Daniel Bey from southern Daghestan; and though the results of this campaign did not correspond to the magnitude of the Russian equipments, it marks the turning-point in the fortunes of Shamyl. With 20,000 cavalry he subdued, but not permanently, the region of the upper Terek in 1846; and from this time he had no success in extending his sway over new tribes. The Russians secured the points which they had already occupied, and, instead of sending large army corps into the mountains, compelled the inhabitants to submission by burning the forests, destroying the crops, and carrying off the herds; and from 1852, when Bariatsky took command of their east wing, their successes were more decisive. Shamyl, losing to some extent the confidence of the mountaineers, was obliged to confine himself to defensive operations. During the Crimean war, when a large part of the Russian army was recalled from the Caucasus, the European generals expected that he would make a powerful diversion in the rear of the enemy; and he has been severely reproached for having neglected the opportunity. But both the zeal and number of his adherents had diminished, his resources were exhausted, and his attempts to unite the bordering tribes under his banner were thwarted by religious indifference and political dissensions. Yet his general Wrangel held positions on the Soonia and the Soolak, and he himself by a sudden and daring incursion into Kakheti alarmed the Russian garrisons as far as Tiflis, and aided in preventing the Russians, after their victory at Kureck-Dere, from advancing on Kars. In this expedition two Georgian princesses fell into his hands. He proposed to exchange them for his eldest son Jemal-Eddin, who had been taken prisoner at the first capture of Akulgo, had been educated at St. Petersburg, and had be-

come an officer in the imperial guard. After long negotiations the exchange was effected. The Russians also paid him a ransom of 40,000 rubles, for which he perhaps consented to an armistice. After the peace of Paris, the Russians returned with renewed energy to the subjection of the Caucasus. The chief command was intrusted to Prince Bariatsinsky, but the operations were executed by Gen. Evdokimoff, experienced in mountain warfare, who in 1857 opened a path over the range of Katchalyki, captured the fortified pass of Goitimir, and obtained positions which rendered the submission of the province of Salatau inevitable. Shamyl was forced to retreat, and about the same time his eldest son died of melancholy, unable to resume his father's purposes and habits after his long experience of civilization, and his second son was wounded in battle. Still more unfortunate for him was the campaign of 1858. Evdokimoff surprised the pass of Argun, and destroyed about 100 villages, whose inhabitants fled, or submitted to him and were transplanted to districts commanded by Russian forts. By a bold countermarch Shamyl fell, Aug. 11, upon the division of Mishtchenko; but after a hard contest his forces were put to flight, and a large part of his arms and supplies were taken by the enemy. Meantime Evdokimoff pursued his advantages, and approached Weden, which for 14 years had been the centre of the prophet's power, and which was strongly fortified, and defended by his son Kasi-Mahom with 7,000 men. The siege had continued for 7 weeks, when, on April 12, 1859, it was decided to bombard and storm it. Shamyl himself arrived with a small body of cavalry, only in time to see that breaches had been made and that further resistance was hopeless, and fled with his surviving followers into the ravines of the mountains. The authority which he had wielded for a quarter of a century was now lost. The tribes generally deserted him, and the chiefs submitted to Russia. Even Daniel Bey surrendered himself unconditionally, and received pardon, since he transferred Irib, the most important fortress after Weden. The only seat of rebellion that remained was the mountain fortress of Ghunib, in which Shamyl had taken refuge with 400 followers. This fortress was on a plateau, defended on one side by massive walls with 6 cannon, and on all others by its steep craggy sides. But these sides were scaled by 3 Russian columns, favored by a thick mist (Sept. 6), and after a desperate contest the prophet recognized the decree of fate, and yielded to the conqueror. His wives and treasure were spared to him, and he was taken to St. Petersburg, where Alexander II. did honor to himself by his treatment of the captive. He remained a few days in the capital and in Moscow, and then proceeded to Kalooga, where he has since resided. He made the happiest impression by the tact and spirit which he displayed in conversation. A Russian eye-witness describes

him as tall, broad-shouldered, haggard, with deep-set eyes, and a long dark red beard; he walks slowly and with dignity; his furrowed lineaments reveal his intellectual power, and his paleness and an air of debility bespeak the sorrows hidden under an impressive repose. His most striking characteristic from earliest childhood has been religious earnestness. As a boy he passed whole days in solitary meditation, prayer, and reading the Koran. Believing himself endowed with the gift of prophecy, and possessing a mastery of fervid eloquence, it seemed for years doubtful whether he would become a dervish or a soldier. The faith of Muridism, of which he was the prophet, is Sufism rendered more intense and effective by the earnest profession of the Koran.

SHANGHAI, or SHANGHAE, a city and seaport of China, in the province of Kiang-su, situated on the left bank of the Woosung river, about 14 m. from its mouth in the estuary of the Yangtse-Kiang, in lat.  $31^{\circ} 10' N.$ , long.  $121^{\circ} 30' E.$ , about 170 m. E. S. E. from Nanking; pop. estimated at 150,000. It stands in a fertile plain, and consists of a walled town and several suburbs, the most important of which is that occupied by the foreign merchants. The wall is high and thick and nearly 5 m. in circuit; but there is considerable vacant space within this area, and toward its centre there are many gardens. The city is entered by 6 gates, and the streets are narrow and filthy. The houses are principally built of brick, and have generally a mean appearance. There are tea gardens which occupy a large square neatly laid out and planted with trees. The suburb occupied by the foreign merchants contains many handsome gardens, the mansions of European and American merchants, and a neat church. The climate is sometimes unhealthy at the season when the S. W. monsoon changes. From June to October heavy rain falls, and occasionally floods the surrounding country. The manufactures consist chiefly of different kinds of silk and embroidered goods, cotton, paper, ivory, and glass. The river is deep and about 900 yards wide, and is bordered by warehouses and quays.—Shanghai is connected by rivers and canals with about  $\frac{1}{4}$  of the Chinese empire, and the internal trade is very considerable. Between 5,000 and 6,000 vessels are employed in it, and upward of 7,000 sea-going craft, exclusive of boats and fishing vessels, are engaged in the coasting trade. In 1858, 754 foreign vessels entered the port, of an aggregate of 242,624 tons; of these, 290, of 120,205 tons, were British, and 97, of 56,280 tons, were under the flag of the United States. The exports consist principally of tea, silk, camphor, and porcelain, and in 1858 amounted to \$45,823,163, beside \$14,248,978 of treasure. Of the tea exported, the United States took 21,122,644 lbs., Great Britain 20,271,657, and other countries 4,071,401; total, 45,465,702 lbs. During the same year 72,729 bales of silk were exported, 64,375 of which were raw and 6,484

were thrown; 26,451 bales were shipped for Great Britain direct, 42,775 for Great Britain and Europe indirectly, 1,638 for the United States, and 1,870 for other places. The imports consist of grain, flour, furs, cotton, coals, different kinds of manufactured goods, silver, and opium. In 1858 the total value of the imports was estimated at \$59,338,480, viz.: goods and merchandise, \$29,470,000; specie and bullion, \$6,180,000; opium, \$23,738,480. Among the imports were 414,505 pieces of American gray twills, and 36,400 pieces of sheetings.—Shanghai was taken by the British in June, 1842, but was given up the following year after the ratification of their treaty with the Chinese, when it became one of the 5 ports opened to foreign commerce. The trade has since then been greatly extended, and the importance of the place much increased. In Sept. 1853, it was captured by the rebels, but was shortly afterward evacuated, and has since been several times threatened by them.

SHANNON, a S. E. co. of Missouri, intersected by Current river; area, about 800 sq. m.; pop. in 1860, 2,284, of whom 13 were slaves. The surface is uneven, and partly occupied by pine forests. Mines of copper and iron are worked. The productions in 1850 were 2,248 bushels of wheat, 46,639 of oats, 56,713 of Indian corn, and 2,937 lbs. of wool. Capital, Eminence.

SHANNON, the largest river of Ireland, rises at the foot of Mount Oulicagh in the N. W. part of the county Cavan, flows S. W. for a few miles to Lough Allen, thence by a circuitous but generally S. course through Lough Ree to Lough Derg, and thence S. S. W. to Limerick, below which the river, here called the Lower Shannon, flows W. S. W. through a broad estuary to the Atlantic. Its total length is about 220 m. It forms the boundary line between the counties Leitrim, Longford, Westmeath, King's, Tipperary, Limerick, and Kerry on the E. and S. E., and Roscommon, Galway, and Clare on the W. and S. W. Beside the large lakes or expansions named, it passes through several smaller ones, and portions of its course are very picturesque. Its largest affluent is the Suak, which enters it from the W. between Loughs Ree and Derg; others are the Boyle, Fergus, Inny, Brosna, Mulkerna, and Maig. The principal towns on its banks beside Limerick are Leitrim, Carrick, Athlone, and Killaloe. The tides in the estuary of the Shannon vary between 14 and 18 feet, and vessels of 400 tons can ascend as far as Limerick; the navigation has been improved throughout the entire length at a cost of about \$2,500,000, and it communicates by canals, &c., with Dublin and the rivers Barrow and Snir and various other parts of Ireland. The total descent of the river between its source and the sea is 345 feet, but the greater part of this fall is before it enters Lough Allen, only 11 m. from its source. In the narrow parts of the estuary the tide runs with great force, and at the springs

has the appearance of a bore. The Shannon is famous for its eel fishery.

SHANNY, the name of the marine spiny-rayed fishes of the blenny family, and the genus *pholis* (Flem.). They differ from the blennies proper in having the head without crests or tentacles; the body is elongated and compressed, with large pectorals, rounded caudal, ventrals under the throat and of 2 rays, and a single interrupted dorsal all along the back, simple and flexible; the skin is naked; mouth small, with large lips and semicircular opening; teeth in single series, numerous, small, and pointed; there is no air bladder; the stomach is thin, without caecal dilatation, and the intestine simple without pancreatic caeca; aperture of oviduct between anus and urinary canal, and a tuft of papillae around the seminal opening. The European shanny (*P. lavis*, Flem.) is rarely more than 5 inches long; the colors vary much, some being mottled with reddish brown, black, and white, and others uniformly dusky; the head over the eyes is rounded, from these the profile being nearly vertical, and between them a deep groove; the irides are scarlet, and the cheeks tumid; the eyes have movements independent of each other. They are abundant on the rocky coasts of England and France, keeping on the bottom, and hiding under stones at low tide to guard against voracious fishes and long-billed birds; the food consists of small mollusks and crustaceans, which they detach from the rocks by the sharp teeth; they spawn in summer; they are of small size, swim in shoals, and are of no value as food to man. The larger specimens have the habit of creeping out of water, by means of the ventrals, as the tide recedes, hiding in holes of the rocks, and there remaining until the tide again rises; they occupy these holes singly, with the head outward, retiring backward at the approach of danger; they have been known to live 30 hours in a dry box, and are very soon killed by fresh water. It is a matter of considerable physiological interest to ascertain how this fish is enabled to live so long a time out of water; it has no air bladder or rudimentary lung for the aëration of the blood; it is not stated to have any special arrangement of the gills or accessory sac for retaining water; the gill openings are very large, just the opposite from the case in the eels and other fishes which live long out of water, and would permit the gills to become very soon dry and improper to circulate the blood; and it would be supposed that this fish would perish out of water as soon as the mackerel, herring, and others with large gill openings. Flourens maintains that the death from asphyxia in these cases is not so much from the drying of the gills, as from the gills subsiding into a compact mass and presenting too small a surface for the action of the air on the contained blood; whether this fish has any special mechanism for separating the leaflets of the gills is not ascertained. It must be remem-

bered that the body is soft and scaleless; cutaneous respiration is very important in batrachians, and perhaps the necessary oxygenation of the blood is effected through the skin, as in the *synbranchus* of Surinam, when the gills are not in action, under the control of the par vagum nerve; perhaps also air may be swallowed, and intestinal respiration supply the necessary oxygen, as in *cobitis*. The gill openings, however, though large, may be accurately shut, and the bulging cheeks may thus retain sufficient water to prevent the desiccation of the gills, assisted probably by the skin as a respiratory organ.—The radiated shanny (*P. subbifurcatus*, Storer), found rarely on the coasts of Massachusetts and New York, is about 5 inches long, of a reddish brown color above and yellowish white below, with 3 dark-colored bands passing backward from the eyes; the lateral line is subbifurcated, and there are filaments on the nostrils. The Carolina shanny (*P. Carolinus*, Cuv.), from the coast of the southern states, is about 4 inches long, of a greenish color with 4 or 5 irregular clouded spots along the back, and brown spots on the fins.

SHARK, an extensive family of marine cartilaginous fishes, with the rays or skates and the chimæra or sea cat forming the order of plagiostomes or selachians, elevated under the latter name to a class by Agassiz. The sharks may be distinguished from the rays by their elongated fusiform body, branchial apertures on the sides of the neck, pectoral fins of the usual form and situation, and large, fleshy, and powerful tail, which is the principal organ of locomotion; the nose is pointed and projects beyond the mouth, which is large and armed with formidable cutting teeth in several rows; the upper surface of the head often presents a pair of respiratory spiracles; the eyelids are distinct, with a free margin, and many have a nictitating membrane; the cartilaginous scapular arch is not attached to the spinal column, which contains more ossific matter than the other parts of the skeleton, the bodies being frequently largely perforated by sailors and used as rings to confine their cravats; the gills have their margins attached, the water escaping by 5 branchial openings (sometimes more); the skin is rough with osseous tubercles, and is sometimes used for smoothing wood; the liver is valuable for its oil, and the flesh is frequently eaten by fishermen and sailors; the aortic bulb has several series of valves, and the shortness of the intestine is counterbalanced by the extended spiral valve. They are essentially carnivorous animals, and, as in the birds of prey, the females are larger and fiercer than the males; they swim with great ease and rapidity, playing around the fastest ships and steamers; they are extremely voracious, devouring either living or dead animal matters, but, from the situation of the mouth on the under side of the head, are obliged to turn on the side or back in order to seize a large object. Many of the smaller species have received the

names of dog and hound, with various canine epithets, from their habit of following their prey in packs. Sharks are higher than ordinary fishes in the phenomena of reproduction; there is with them true sexual union, and they are ovoviviparous, that is, the eggs are hatched in the oviducts, though they are often expelled before the embryo has quitted them; the egg presents in its early development many peculiarities of those of the higher vertebrates. In some the eggs are received into the villous oviduct, in which as in a uterus the young are developed; under these circumstances ova are observed in different stages of development, and frequently one in each oviduct. In others the egg is received in a horny, semi-transparent, oblong case, with long convoluted tendrils at each corner, deposited near the shore in the winter months, and prevented from being too rudely treated by the waves by the tendrils mooring it to a seaweed or other body; the case has an elongated fissure at each end for the entrance and exit of water, and the young shark escapes at the end where the head is situated; the young animal swims about for a time deriving its nourishment from the attached yolk bag, which, when it is able to take food by the mouth, is absorbed as in birds and mammals. The egg cases are often cast ashore by the waves, and are commonly known as sailors' purses. About 100 species of sharks are known, mostly in northern waters and the eastern hemisphere; some are almost cosmopolite, while others have a limited geographical distribution; the family contains the largest of the fishes, the great basking shark attaining a length of more than 30 feet.—In the family *scyliidae*, generally called dog fishes to distinguish them from the sharks proper, spout holes are present; the snout is short and blunt; the gill openings are 5, the last one over the base of the pectoral; 2 dorsals, far back and behind the ventrals; an anal present; caudal long, truncated at the end, with a notch on the under side; no caudal pit; a furrow at the corners of the mouth; teeth with a pointed median cusp, and 4 or 5 small points on each side; the parts about the mouth and nose in some genera are divided into flaps and barbels, evidently organs of touch, necessary in their rapid passage along the bottom. They are oviparous, and the eggs resemble those of a skate. In the genus *scylium* (Müll. and Henle) the spout holes are close behind the eyes, and the nostrils near the mouth and valved; dermal scales tricuspid. Most of the species are found around the southern coasts of Africa; they are among the smallest of the sharks, and live near the ground. There are 2 species on the English coast, the *S. catulus* (Cuv.) and *S. canicula* (Cuv.). The former is 2 or 3 feet long, brownish gray above, with a few large blackish and white spots, and whitish below; the food consists of fish, mollusks, and crustaceans; the female deposits about 20 eggs, according to Cuvier. The latter, the small

spotted dog fish, about 2 feet long, is of a more reddish tint, with more numerous and smaller spots; it is widely distributed, following ships and seizing whatever falls or is thrown overboard; it eats chiefly fish, but has been known to attack fishermen and bathers; it lies in ambush in the mud or among weeds, darting thence upon its prey. Both these species are the pests of the fishing stations all along the coast, especially among the Orkney islands, robbing the lines at every opportunity, and not unfrequently caught themselves; the flesh is white, but dry and fibrous, and, though eaten by the fishermen, is rarely brought to market; in the Orkneys they are skinned, split, and dried; the skin is used by cabinet makers as a fine rasp, and the liver is valuable for its oil. Among the other genera and species of N. E. Asia are many whose fins are esteemed a delicacy for soups by the Chinese; the English species are doubtless as good for this purpose, and in some localities the fins might be profitably collected for exportation.—Under the name of *squali* Cuvier comprehended all the other sharks, except the hammer-head and monk fish, of which he made distinct genera; Owen gives the name of *nyctitantes* to a portion of the *squali*, chiefly *carcharidæ* and *galeidæ* (described below), the presence of a nictitating membrane to the eye being accompanied with a greater induration of the skeleton. In the family *carcharidæ* there are 2 dorsals and an anal, the 1st dorsal over the space between the pectorals and ventrals; there are no spout holes, and the last 2 gill openings are over the pectorals; nostrils generally small, pupil perpendicularly oval, and mouth boldly convex; the teeth are compressed, triangular, with an entire or serrated edge, arranged in a linear series like those of a saw, in several rows, of which the anterior only are erected for use, the posterior lying flat; the tail has a short under lobe and a notch near the end of the upper; there is a pit above and below the base of the tail; the intestinal valve is longitudinally and not spirally rolled; skin comparatively smooth. The genus *carcharias* (Müll. and Henle) has been divided into various subgenera, but all have the nostrils midway between the mouth and end of the flattened snout, the labial cartilages very small, and the yolk bag connected with a kind of uterine placenta in the smooth or villous oviduct. The white shark (*C. vulgaris*, Cuv.) attains a length of 30 to 35 feet, and a weight of more than 2,000 lbs.; the color is ashy brown above and whitish below; the head is large, the gape enormous, and the body stout; the teeth form such a perfect cutting apparatus, that the body of a man may be cleanly divided at a single bite; some of the jaws of this species (which are not the true jaw bones, however) are large enough, even when shrunk by drying, to slip over the body of a man; it has been seen near Calcutta to swallow a bullock's head and horns entire. This is the man-eater shark about which so

many stories have been circulated, and it is certain that human remains have been found in its stomach; it is gluttonous, savage, and bold, and is truly the tiger of the ocean; its ordinary food consists of large fish, seals, cuttle fishes, and even decaying animal matters. It is found in almost all oceans, though most abundantly in tropical waters, and is a rapid and surface swimmer; it occasionally makes its appearance in the Mediterranean and on the British coasts. It is the terror of sailors, who always kill it when possible; as it follows ships to feed upon the garbage thrown overboard, and bites eagerly at any large bait dragging at the stern, it is not unfrequently caught, the precaution being taken to cut off the tail as soon as it is brought on board in order to prevent injury from this powerful organ. Sailors have a superstition that it keeps company with vessels having sick persons on board, being supposed to ascertain this by the acute sense of smell, in hopes of feasting on the body when thrown overboard; they also follow slave ships from Africa to America, and obtain many of the victims of this traffic; but it is giving them too much credit both for intelligence and acuteness of smell, to pretend that their company is in any way due to the expectation of a meal of human flesh. Their sense of hearing is very fine, if we can judge from the large size of the semicircular canals and vestibule of the ears. The young are born alive at different periods, until 20 or 30 are produced; they are 7 or 8 inches long at birth. This species meets with a formidable enemy in the sperm whale, and is often destroyed by it after a long and bloody combat; like all sharks, it is greatly infested with *tenia* and other intestinal worms. The blue shark (*C. glaucus*, Cuv.) is a smaller species, rarely more than 8 feet long; it is more slender and elegantly formed, and the most beautiful in color of the sharks, being fine slate blue above, and white below; the skin is granulated and rough. It is distributed in most parts of the globe, and is very bold and voracious; its principal food consists of herring, shad, and other migratory fishes; it is a great pest to the British fishermen, snapping off the fish as they are drawn to the surface and biting off the lines; when hooked, if they cannot divide the line, they are in the habit of rolling themselves over and over so as to wind it around the body, sometimes beyond the power of extrication except by the knife; they also make great havoc in the pilchard fishery, destroying the nets and devouring the fish. Like the white shark, this species is often attended by the pilot fish, which follows the great selachians, as human parasites do men of wealth and power, for the sake of the small pickings left in their train. (See PILOT FISH.) There are many stories of the extreme affection of this species for its young, which are said to take refuge when alarmed in the stomach of the parent, but it is a modification of the story of the lion lying down happily with the lamb,

the latter being inside the former; there can be no doubt that small sharks are often found in the stomachs of the larger, but this is rather a proof of cannibalism and unscrupulous voracity than of parental affection, and the return of the young sharks alive from the stomach of the old is exceedingly improbable. Of the American species of this genus may be mentioned the dusky shark (*C. obscurus*, Lesueur), attaining a length of 10 to 12 feet, dark brown above and dirty white below, occasionally found on the coast of the northern and middle states; the small blue shark (*C. caeruleus*, Mitch.), 3 to 6 feet long, slate blue above and whitish below, found in the same waters; and Atwood's shark (*C. Atwoodi*, Storer), coming nearest the great white shark, attaining a length of 18 or 14 feet and a weight of 1,500 lbs. The color of the last named is leaden gray above and white below; it has been caught off the coast of Massachusetts.—In the family *galeida*, tope or hounds, the fins, nostrils, gill openings, and mouth are as in the *carcharida*; there are very small spout holes; the teeth are alike in both jaws, with cutting edges and a cusp pointing obliquely outward; the upper lobe of the tail is much the longer and notched near the end; the scales small, 3-ridged, with a median cusp. In the genus *galeus* (Cuv.) the pupil is round above and angular below; the teeth smooth on the inner edge, serrated on the outer, with the cusp smooth; the median teeth straight, jagged at the base on each side; no tail pits, and the intestinal valve spiral. The common tope or penny dog (*G. vulgaris*, Cuv.) attains a length of 6 feet; the body is fusiform, of a slate gray above and grayish white below; it is rapacious, though less so than the blue shark, and a pest to the fishermen in summer on the southern coasts of England; when hooked, if it cannot bite off the line, it rolls itself up in it; the young, to the number of 30 or more, are born in May and June; the liver is of some value for its oil. The arctic tope (*galeorcedo arcticus*, Müll. and Henle) is a northern species found about Norway and Iceland; the teeth are serrated on both edges, there is a tail pit above and below, and the intestinal valve is longitudinal. The genus *mustelus* (Artedi) of this family has been described under Dog-FISH; in this the teeth are pavement-like as in the rays.—In the family *lamnida* the gill openings are very large, all anterior to the pectorals; they have no nictitating membrane, and the spout holes are small, tail pits evident, caudal broadly forked and nearly crescentic, tail keeled on the sides, and the intestinal valve spiral. In the genus *lamna* (Cuv.) the snout is a 3-sided pyramid with a short nasal flap, the spout holes far behind the eyes, and the mouth wide; the teeth are triangular, not serrated, with an acute toothlet at the base on each side, the surface resting on the jaw being deeply concave; there is a vacant space above and below instead of mesial teeth; skin comparatively smooth, and the scales very small. The por-

beagle shark (*L. cornubica*, Cuv.), found on the northern coasts of Europe especially in autumn, attains a length of 9 feet; it is uniform grayish black above and white below. They associate in small packs, from which and the porpoise-like form of the body, the common name is derived; they feed chiefly on fishes and cephalopods; they are ovoviviparous. The mackerel shark (*L. [oxyrhina] punctata*, Mitch.) of North America is greenish on the back, lighter on the sides, and white below; the teeth are narrow, long and nail-like, calculated for holding rather than cutting prey; the head and sides are punctured by a series of mucous pores. Like the English porbeagle, this species from its size and formidable teeth is the most dangerous of the common sharks, though it is not ascertained that it attacks man unless in self-defence; it is common in summer on the New England coasts, and is a great pest to the mackerel and cod fishers, biting off both fish and line; it may attain the length of 10 feet, but is usually not more than half this; it received its name from its following the shoals of mackerel on which it feeds; the liver is valuable for oil, a single fish often yielding 6 or 7 gallons; though generally used by curriers only, when made carefully from fresh livers it is as good as whale oil to burn. The gray shark (*Odontaspis griseus*, Ag.) has the fore teeth simple, long, conical, with smooth edges and one or more basal toothlets; toward the corners the teeth are smaller and more incisorial; it attains a length of 4 to 7 feet, and is light bluish gray above, lighter on the sides, and white below; it is not uncommon in Long Island sound, and of late years in Massachusetts bay. In the genus *selache* (Cuv.) the snout is short and blunt, and the gill openings almost meet under the throat; the teeth are very small and numerous, conical, without serrations, curving backward, and without toothlets and notches; scales small, with radiating curved points, so that the skin feels rough; the eyes are very small. The great basking shark (*S. maxima*, Cuv.) is the largest of this class of fishes, attaining a length of 30 or 40 feet, and even over 50 if the shark stranded at Stronsa in 1808, and described as the sea serpent, belonged to this species. It is an inhabitant of the northern seas, descending in summer from the neighborhood of Greenland and Spitzbergen to the English channel and the middle United States. Notwithstanding its size and strength, it is the least ferocious of the sharks; it does not appear to feed on fishes, but on cuttle fishes, crustaceans, medusæ, and echini, and, according to Pennant, also on sea weeds. It is sluggish in its movements, and fond of reposing at the surface in the sun with the dorsal raised in the air, and hence called sun fish, sail fish, and basking shark; under these circumstances it is easily approached and harpooned; this is often done for the sake of the oil of the liver, which amounts to several barrels in a full-grown fish; it is dangerous to attack, as from its speed and

strength it is apt to pull a boat under water or overturn it; it has been known to drag a vessel of 70 tons against a fresh gale, and requires often 24 hours to fatigue and kill it. It is dark slate-colored above, and lighter below. The *S. elephas* (Lesueur) is probably the same species; it has been taken in the bay of Fundy 40 feet long; on the New England coast it is called the bone shark by fishermen.—In the family *alopeiidae* the snout is short and conical, the spout holes and nostrils very small, the gill openings small, the last one over the pectorals; mouth comparatively small, the teeth not serrated, triangular, sharp, and alike in both jaws; no tooth on the mesial line, and a crescentic fold of skin behind the upper teeth; the 2d dorsal opposite the anal and very small; pectorals large and triangular; upper lobe of tail as long as the body, with a pit at the root; scales small and 3-pronged, and intestinal valve spiral. It contains the single genus *alopias* (Raf.), and the single species *A. vulpes* (Raf.), the swingle-tail, fox, or thresher shark; it attains a length of 15 feet, but is generally much smaller than this; the body is fusiform, bluish lead-colored above, white below, with light blue blotches on the outer edge of the abdomen. It attacks its prey and enemies and defends itself by blows of the tail; it in this way disperses the shoals of smaller cetaceans; the food consists principally of herring, mackerel, and other surface and shoal fish of small size. It is found in the European seas from the Mediterranean to the coast of England, and also on the American side from the British provinces to the middle states; it has been known to attack fishing boats in the bay of Fundy.—In the family *cestracionidae* the nostrils are slit to within the mouth, which is at the fore end of the snout; the spout holes are rather behind the eyes; the gill openings small, the last one above the pectorals; a spine forming the front of each dorsal; tail short and wide, strongly notched below; teeth pavement-like, in rounded oblique scrolls; the body short and stout, head large, and eyes prominent. The genus *cestracion* (Cuv.) furnishes the only living representative of a family numerous in the secondary geological epoch; the *C. Phillipsii* (Cuv.) attains a length of 2 or 3 feet, and is brownish above and whitish below; it inhabits the Pacific from Australia to Japan; it is called nurse in Australia, and cat or kitten shark in China; the young are often seen in Canton insect boxes.—In the family *notidanidae* there is only one dorsal and no nictitating membrane; the upper corner fold of the mouth very large, the under one small; the spout holes vertical and small; there are 6 or 7 gill openings, gradually decreasing in size, and all before the pectorals; a mesial upper tooth, the rest low and flat toward the corners of the mouth, triangular above and serrated below, and the foremost crowded and curved; lower lobe of the tail small, truncated, and notched at the end; no tail pits, and the intestinal valve spiral. The genus *notidanus* (Cuv.)

has been subdivided by Rafinesque into *hexanchus* and *heptanchus*, according as there are 6 or 7 gill openings; the species are small, about 3 feet long. There are 2 in the Mediterranean, the *N. (hep.) cinereus* (Cuv.), with 7 branchial openings; and the *N. (hex.) griseus* (Cuv.), with 6 branchial openings, ash-colored above and whitish below; the last sometimes wanders as far as the English coast.—In the family *spinacidae* there are spout holes, 2 dorsals, each fronted by a spine, no nictitating membrane, and 5 gill openings, all before the pectorals; teeth small and acute, and intestinal valve spiral; the principal genus, *acanthias* (Bonap.), has been described under Dog-Fish.—In the family *scymnidae* the dorsals are without spines, and there is no anal nor nictitating membrane; the upper teeth are pointed, the lower broader and cutting and not denticulated; no tail pits; intestinal valve spiral. In the genus *scymnus* (Cuv.) the spout holes are far behind the eyes, the gill openings small, the body short and thick, and the lobes of the tail not very unequal. The Greenland shark (*S. borealis*, Flem.) attains a length of about 14 feet, and is of an ashy gray color; it inhabits the arctic seas, sometimes visiting the northern shores of Europe and America. It is a great enemy of the whales, attacking them fiercely, and with its incisorial teeth scooping out at every bite a piece as large as a man's head, the mouth being 20 to 24 inches wide. According to Scoresby, they generally attend the cutting up of whales, helping themselves freely to blubber; the men often fall into the water among them, but are not attacked; they are so tenacious of life, and so insensible to wounds, that they will return to their prey after having received lance stabs which would kill any other shark; the muscles, especially those of the jaws, retain their irritability for several hours after death; the heart is said to be very small, and its pulsations only 6 or 8 in a minute, which would explain their tenacity of life and the difficulty of reaching any vital organ. They also eat small fishes and crustaceans. They are liable to the attacks of a parasitic crustacean (*lerna elongata*, Grant), 2 or 3 inches long, which fixes itself so often to the cornea of the eyes, that it was formerly supposed to be a natural appendage; this so seriously impairs vision as sometimes to make them apparently blind, so as neither to attempt escape nor avoid a threatened blow. The nurse or sleeper shark (*S. brevipinna*, De Kay; *somniosus*, Lesueur) attains a length of 8 feet; the color is leaden gray, darkest on the back, with a black lateral line; the fins are so small that it must be rather slow in its movements, and it is generally regarded as a ground shark; the skin is rough and prickly; a few specimens have been caught on the coast of Massachusetts.—In the family *squatinae*, intermediate between the sharks and rays, the body is flattened above and below, and discoid in shape on account of the broad pectorals and ventrals, as in rays; the mouth is very wide



and at the end of the snout, the eyes small and on the dorsal aspect with the large spout holes behind them; the head rounded anteriorly; the pectorals separated from the head by a furrow in which are the long and closely approximated gill openings; 2 dorsals, both on the tail, further back than the ventrals; tail keeled on the sides, and the caudal nearly or quite symmetrical; male claspers small, scales conical, with a terminal point; teeth conical, irregular, with interspaces. These are the characters of the only genus, *squatina* (Dum.), of which the best known species (*S. angelus*, Dum.) is called shark ray from its appearance, angel fish from the resemblance of the expanded pectorals to wings, monk fish from its rounded head seeming to be enveloped in a cowl, and fiddle fish from its general shape. It attains a length of 7 or 8 feet, and is rough and mottled with brown and bluish gray above, and smooth and dirty white below; the pectorals are lighter and bordered with brown, the nostrils covered by a ciliated membrane, and a row of spines along the back. It is not uncommon in European seas, and in the Mediterranean, where it was known to Aristotle, in whose time, as now, the rough skin was used to polish wood. They are gregarious, fierce and dangerous to approach, hideous, and very voracious, swimming near the bottom, and feeding on flat fishes and other species living in the mud or sand; the young are produced alive in June. The flesh is white, coarse, and tasteless, though formerly esteemed as food. A species has been described on the American coast as the *S. Dumerili* (Lesueur).—In the family *zygænidæ* there is a nictitating membrane, no spout holes, and 2 spineless dorsals; the head is flat, with the orbits extended laterally in a most extraordinary manner, flexible and doubled on themselves in the fœtus, but standing out at right angles and to a greater distance as age advances; on the end of these lateral processes are the large eyes. This strange form of head is found in no other vertebrate, and only in some dipterous insects (*diopsis*, &c.), and in many decapod crustaceans whose eyes are at the end of long pedicles. The snout is truncated, so that the head resembles a double hammer; the nostrils are on the front border, and have a small nasal flap; the teeth are alike above and below, compressed pyramids, sometimes with a serrated external basal ridge, and a mesial tooth in both jaws; tail pits distinct, and oviduct villous. Such are the characters of the only genus, *zygæna* (Cuv.) or *sphyræ* (Vander Hoeven), of which the best known species is the hammer-headed shark (*Z. [S.] malleus*, Cuv.); it attains a length of 12 feet or more, and is grayish above with head nearly black, and whitish below; the iris is yellow; the 1st dorsal is high, triangular, falcate, and toward the upper part of the back, the 2d smaller and near the tail. It is found in the Mediterranean and in the warm seas of most parts of the globe, especially of the East Indies, and generally in deep water. It

is so ferocious as to attack persons bathing, and is very voracious, feeding chiefly on rays and flat fishes; great numbers of them are sometimes seen together; the flesh is leathery and unfit to eat, but the liver yields considerable oil; a female opened at Penang was found to contain over 35 living young. The *Z. tiburo* (Cuv.), with a head more resembling the blade of a shovel than a hammer, has been found on the European and American coasts. The common species of America, between Massachusetts and Brazil, once considered the *Z. malleus*, has been described by Dr. Storer ("Proceedings of the Boston Society of Natural History," vol. iii. p. 71, 1848) as the *Z. arcuata*; it attains a length of 11 or 12 feet, and is much dreaded by fishermen.—Sharks of large size abounded in former geological epochs, especially during the secondary and primary periods. In some of the tertiary formations, as at Malta, teeth of sharks have been found 7 inches long and  $4\frac{1}{2}$  wide at the base, which many have supposed must have belonged to gigantic species, perhaps 60 to 100 feet long; but it must be remembered that the great basking shark has teeth very much less in size than many *carcharidæ* of considerably smaller dimensions; it is probable that these large teeth belonged to sharks not more than 25 or 30 feet in length.

SHARP, DANIEL, D.D., an American clergyman, born in Huddersfield, England, Dec. 25, 1783, died near Baltimore, Md., June 23, 1853. At the age of 22 he came to New York as the agent or factor of a large commercial house in Yorkshire, afterward studied theology under the Rev. Dr. Staughton at Philadelphia, and was ordained as pastor of the Baptist church in Newark, N. J., in 1809. In 1812 he became pastor of the third (now Charles street) Baptist church, Boston, and continued there till his death. He was an active member of the Massachusetts missionary society, the forerunner of the home mission society, one of the editors of the "American Baptist Magazine," one of the pioneers in the movement for foreign missions, and an officer of the triennial Baptist convention almost from its organization, for many years the president of its acting board, and after the change of organization the first president of the missionary union. He was one of the founders of the northern Baptist education society and of the Newton theological seminary, and was for 18 years president of the board of trustees of that institution. He also actively participated in every enterprise for promoting the temporal or spiritual welfare of the people of Boston. In 1828 he was chosen a fellow of Brown university, from which he received in the same year the degree of D.D., as also from Harvard university in 1843; and in 1846 he was appointed a member of the board of overseers of the latter institution. Dr. Sharp's published writings consist entirely of sermons and addresses, of which about 20 are extant. Several of them have passed through a number of editions.

SHARP, GRANVILLE, an English philanthropist, born in Durham in 1734, died in London, July 6, 1818. He was the son of Dr. Thomas Sharp, archdeacon of Northumberland, and the author of several philological, antiquarian, and religious works, and grandson of Dr. John Sharp, archbishop of York. He was educated for the bar, but quitted the study of his profession for a place in the ordnance office, which he resigned at the commencement of the American war, from disapprobation of the course pursued by the English government. He then took chambers at the Temple, intending to devote himself to literature. In 1769 a negro slave named Somerset, who had been brought to England, had on falling ill been turned into the streets by his master. Sharp met him and took him to a hospital, and when he was recovered procured him a situation. Two years later the negro's master claimed him, and had him arrested and imprisoned. Sharp summoned them both before the lord mayor, who discharged the slave; but the master refusing to give him up, Sharp brought the case before the court of king's bench, the 12 judges of which, in May, 1772, decided that a slave could not be held in or transported from England. From this time Mr. Sharp devoted his powers to the overthrow of the slave trade and of slavery. He wrote numerous pamphlets on the subject, and in 1787 was chairman of the meeting which formed the "Association for the Abolition of Negro Slavery." He was one of the founders of the British colony of Sierra Leone, drew up a plan for its temporary government, and sent many negroes there at his own expense. He was also an active and consistent advocate of popular rights, opposing the impressment of seamen, and interfering by the writ of *habeas corpus* for their release; advocating parliamentary reform, and the extension of privileges to Ireland; and opposing duelling. His writings on these and other subjects were very numerous, but were mostly pamphlets prepared for temporary purposes. Among those still referred to are: "Representation of the Injustice and dangerous Tendency of Tolerating Slavery in England" (8vo., London, 1772); "Remarks on the Uses of the Definite Article in the Greek Testament;" "Treatises on the Slave Trade;" "Treatise on Duelling;" "Declaration of the People's Natural Right to a Share in the Legislation" (London, 1778); "Account of the English Polity of Congregational Courts" (8vo., London, 1786); and "The Law of Nature and Principles of Human Action." His biography was written by Prince Hoare (4to., London, 1810).

SHARP, JAMES, a Scottish prelate and politician, born in the castle of Banff, Banffshire, in May, 1613, assassinated on Magus Muir, near St. Andrew's, May 3, 1679. He was educated for the church in the university of Aberdeen, and was one of the young men of that institution who in 1638 declared themselves against the "Solemn League and Covenant." To avoid the odium consequent upon this act, Sharp went

to England. Two years later he returned to Scotland, was chosen one of the professors of philosophy in St. Leonard's college, St. Andrew's, and shortly after became minister of the parish of Crail. He is said to have been one of the number of ministers who, in Aug. 1651, were seized by order of Gen. Monk, put on board a ship in the Tay, and carried prisoners to England. He returned to his charge at Crail, however, while his companions were still held prisoners, and it was asserted that his freedom had been purchased by some compliances prejudicial to the Presbyterian cause; but he retained the confidence of the Presbyterians, and in 1660, when Monk marched upon London, he was regularly accredited to that general as their representative, and was sent over to Charles II. at Breda to procure from him if possible the establishment of presbytery. He was received very favorably by the king, and obtained the royal word "to protect and preserve the government of the church of Scotland, as it is settled by law, without violation." The next Scottish parliament however repealed all acts passed since 1633, the church "settled by law" thus becoming the old Episcopal church; and it was asserted that Sharp was an accomplice in this scheme. While in London he had been elected professor of divinity in St. Mary's college, St. Andrew's, and also appointed the king's chaplain for Scotland with a salary of £200. In Dec. 1661, he was consecrated archbishop of St. Andrew's. This appointment rendered him excessively odious, and most bitter denunciations were uttered against him. The wanton cruelty with which the Covenanters were persecuted was attributed to him, and it is certain that, after the rout at Pentland hills, when he had received the king's order to stop the executions, he kept it for some time private. One Mitchell, a preacher, attempted to assassinate him in the streets of Edinburgh, July 9, 1668; he was apprehended 5 years later, induced to confess his attempt by a promise of pardon, and then executed. A creature of Sharp's named Carmichael had made himself particularly obnoxious to the Presbyterians, and 9 men formed a plan to waylay and murder him. While they were waiting for this person, the archbishop passed by with his daughter and a few attendants; and, shouting: "The Lord has delivered him into our hands," they dragged him from his coach and despatched him with firearms and swords.

SHARP, JOHN, D.D., an English prelate, born in Bradford, Yorkshire, Feb. 16, 1644, died in Bath, Feb. 2, 1714. He entered Christ's college, Cambridge, in 1660, was ordained in 1667, and became domestic chaplain to Sir Heeneage Finch, was made archdeacon of Berkshire in 1672, prebendary of Norwich in 1676, rector of St. Giles-in-the-Fields, London, in 1677, and dean of Norwich in 1681. He was chaplain to Charles II., and attended as court chaplain at the coronation of James II., by whom he was reappointed to that office. For a sermon in

1686 against the claim of the Roman church to be called "the only visible Catholic church," the king made an unsuccessful effort to suspend him from preaching in the diocese of London. He preached before the prince of Orange in 1689, and prayed for King James, though the throne had been declared vacant. In the same year and by the new government he was made dean of Canterbury, and in 1691 archbishop of York. He preached the sermon at the coronation of Queen Anne in 1702. His sermons were published after his death in 7 vols. 8vo., and have been several times reprinted. His life, by his son, Dr. Thomas Sharp, archdeacon of Northumberland, was published in 1829 (2 vols. 8vo., London).

SHASTA, a N. co. of California, bounded E. by Nevada territory, and W. by the Coast range, and intersected by the Sacramento and Pitt rivers; area, 4,800 sq. m.; pop. in 1860, 4,860. The surface is generally mountainous, and the soil along the streams fertile. Considerable quantities of grain and fruit are produced. Gold is very abundant. There are numerous mineral springs, the most celebrated of which are the Soda springs near Sacramento river, and 14 or 15 salt springs. Capital, Shasta City.

SHASTRA, or SHASTER. See VEDA.

SHAW, LEMUEL, an American jurist, born in Barnstable, Mass., Jan. 9, 1781, died in Boston, March 30, 1861. He was graduated at Harvard college in 1800, and was afterward for some time employed as an usher in the Franklin (now Brimmer) school in Boston, and also as assistant editor of the "Boston Gazette." He was admitted to the bar in Sept. 1804, and immediately after commenced practice in Boston. In 1811 he delivered a discourse before the Boston humane society, and on July 4, 1815, an oration before the town authorities of Boston. In 1811 he was elected a representative to the state legislature, was continued in that office for 4 succeeding years, and was again elected in 1819. In 1820 he was a member of the convention for revising the constitution of the state. In 1821 and 1822 he was a member of the senate, and again in 1828 and 1829. The charter of the city of Boston, an able and comprehensive document, was draughted by him. He held various town offices, was selectman, and a member of the school committee. But the practice of the law occupied most of his time and thoughts, and his various public services were never allowed to interfere with his duty to his clients. Upon the death of Chief Justice Parker, he was appointed his successor, Aug. 23, 1830, and held the office till Aug. 31, 1860, when he resigned it. His reported decisions are found in the last 16 volumes of Pickering's reports, and in those of Metcalf, Cushing, and Gray; in all, upward of 50 volumes. In many of these volumes more than one half of the opinions were written by the chief justice; and in general those in the most novel, important, and complicated cases are by him. Few men have contributed more

to the growth of the law as a progressive science. His vigorous physical constitution enabled him to bear the gigantic labors of his post till his 80th year. In 1853 he paid a visit to England, and was cordially received by the English judges and lawyers. He was an overseer of Harvard college for 22 years, and a member of the corporation for 27 years.

SHAWANAW, a new N. E. co. of Wisconsin, intersected by the Oconto, Wolf, Embarras, and Red rivers; area, about 720 sq. m.; pop. in 1860, 8,829. The surface is generally level and the soil fertile. Lake Shawanaw is in the central part, and fine streams of water abound. Capital, Shawanaw.

SHAWL, a garment worn upon the shoulders or about the waist, and formed either of wool or silk, or of these combined, or sometimes of hair or of cotton. The manufacture was introduced from India, where the famous Cashmere shawls have been made from time immemorial. (See CASHMERE.) In England it was undertaken in 1784 at Norwich in the Indian style, with the imported Thibet wool, and afterward with Piedmont silk warp and fine worsted shoot, the designs being worked in by hand. In 1805 at Norwich the shawls were first completed entirely upon the loom. About the same time the manufacture was introduced in Paisley and Edinburgh, and is still continued at the former place of the Indian pattern with real Cashmere wool. In Paris the manufacture was commenced in 1802, and led Jacquard to the invention of his loom. The following are the principal varieties of shawls: those of Cashmere, woven in India or imitated in Europe, with the designs either embroidered upon the fabric, or by the more costly method worked into the web in the process of weaving, thus making both sides of the shawl alike; crape shawls, made of silk in imitation of the Chinese fabrics; grenadines, made of silk of a peculiar twist; chenilles, of silk, often combined with cotton; chiné, made with a warp printed before weaving; barége, of wool, in imitation of shawls made by the peasantry at a place of that name in the Pyrénées; woollen shawls of various kinds; and tartan plaids, made for centuries in Scotland. A description of the colors of tartans worn by the different clans in 1570 is extant. Their use was prohibited by act of parliament from 1747 to 1782; and they became fashionable from about 1828, and have so continued to some extent. The printing of shawl figures is done with blocks as in calico printing, and with the same elaborateness, as many as 100 blocks and 1,600 printings or applications being sometimes necessary for the production of a single pattern. In England the principal shawl printing establishment is at Crayford in Kent. In the United States the business is carried on at Lowell, Mass., and Waterloo, N. Y. In the year ending June 30, 1860, the importations of shawls into the United States amounted to \$2,806,987, of which England furnished \$1,458,080, France \$498,-

574, the Hanse towns \$485,620, China \$202,412, and Scotland \$137,065.

SHAWNEE, an E. co. of Kansas, bounded N. by the Kansas river, and intersected by the Wakarusa; area, about 500 sq. m.; pop. in 1860, 3,513. The surface is undulating and the soil fertile. It has 2 newspapers and 3 or 4 churches. Capital, Topeka.

SHAWNEES, a tribe of Indians belonging to the Algonquin group, formerly living on the Wabash and other neighboring affluents of the Ohio. In 1764, according to Col. Bouquet, they had 500 fighting men. They were a very warlike tribe, and were exceedingly active against the United States. They have a tradition that their ancestors crossed the sea, and are the only tribe that admit a foreign origin. In 1850 they numbered nearly 1,600. They now live on the S. bank of the Kansas river.

SHAYS, DANIEL, a captain in the revolutionary war, and leader in 1786-'7 of the rebellion in Massachusetts which bears his name, born in 1740, died in Sparta, N. Y., Sept. 29, 1825. Although not prominent in the first movements of the rebellion, Shays was chosen leader and took command of the insurgents. They complained that the governor's salary was too high, the senate aristocratic, the lawyers extortionate, and taxes too burdensome to bear; and they demanded an issue of paper money and the removal of the general court from Boston. An effort was made to allay the discontent by the passage of an act to diminish costs in the collection of debts and allow certain back taxes and debts to be paid in produce, but the mob was not satisfied. Bodies of armed men interrupted the sessions of the courts in a number of counties, and in Dec. 1786 Shays appeared with a large force at Worcester and Springfield, and prevented the holding of the courts at those places. In January following, at the head of nearly 2,000 men, he marched to capture the arsenal at Springfield, but was opposed by the militia under Gen. Shepherd, and the advancing insurgents were fired upon and fled in terror, leaving three killed and one wounded on the field. Next day they were pursued by a large force under Gen. Lincoln, and fled from point to point until they reached Petersham, where 150 were taken prisoners, the remainder dispersed, and the leaders made their escape into New Hampshire. The prompt action of the state authorities put a speedy check to the insurrection. A free pardon was granted to all who would lay down their arms, and generally accepted; 14 were tried and sentenced to death, but afterward pardoned. Shays sought safety for a year or so in Vermont, and at his petition was afterward pardoned, and removed to Sparta, N. Y. He was allowed a pension for services in the revolutionary war.

SHEARWATER, a web-footed bird of the petrel family, and genus *puffinus* (Briss.). The bill is about as long as the head, slender, compressed near the end and grooved obliquely on

the sides, with strong, curved, and acute tip; nostrils basal, with 2 distinct tubes, side by side; wings very long and pointed, the 1st quill longest; tail short and rounded; tarsus as long as middle toe and compressed; toes long and united by a full web; in some a straight claw in place of a hind toe. They are moderate-sized, found in both hemispheres, and are met with at sea, often many hundred miles from land, even in the most tempestuous weather, skimming and running over the waves in search of food; they are light and graceful swimmers, good divers, and pat the surface of the water with their feet like the petrels; they are rapid fliers, and can keep on the wing all day, resting on the ocean, if need be, at night; they breed in company, in burrows made by themselves or small animals; they lay only one egg, and the young are covered with long down.—The greater shearwater (*P. major*, Faber) is about 20 inches long and 45 in alar extent; the upper plumage is brownish ash, the lower grayish white; lower back and upper tail coverts dark brown; primaries and tail brownish black, the feathers of the wings with white on the inner webs; bill yellowish green, with dark tip; tarsi and feet yellow. This species is found on the European side of the Atlantic, and ranges on the American coast from the gulf of St. Lawrence to Florida. It mingles with the fulmars, and on being approached ejects from the nostrils an oily substance; on land, where it goes only to breed, it walks as well as a duck. The food consists of fishes, crustaceans, algæ, and other marine products, and floating animal substances. The sooty shearwater (*P. fuliginosus*, Strickl.) is about 18 inches long, sooty brown above, wings and tail blackish brown, under parts pale brown, bill and legs black; it is found off the Atlantic coast of the United States and in Europe; by most ornithologists this has been regarded as the young of the preceding. The Manx shearwater (*P. Anglorum*, Ray) is 15 inches long and 32 in alar extent; the upper plumage is black, the under white, bill brownish black, legs and feet dull orange. It is abundant on the Orkney and other northern islands, and on the American coast from New Jersey to Labrador; it breeds in rabbit burrows in the Orkneys between March and August, and all the rest of the year is at sea; the young are fat, and are sought after by the natives, who salt and eat them. The dusky shearwater (*P. obscurus*, Lath.) is 11 inches long and 26 in alar extent; it very closely resembles the preceding in color; the bill is pale bluish at the tip; it is found in the southern seas, and on the S. coast of the United States. The Turkish shearwater (*P. yelkouan*, Bonap.) is 10 inches long, brownish black above, white below, with black feet and brownish green bill; they are abundant in the canal of Constantinople, and so restless in their flight to, and from the sea of Marmora and the Black sea, that the people call them "lost souls." The cinereous

shearwater (*P. cinereus*, Gmel.) is 19 inches long, leaden gray above, white below; the bill yellowish, with the culmen and groove on the under mandible black; tail brownish black and graduated; tarsi and feet yellow; the form is more robust and the bill stronger than in the other species; it is found in the Pacific ocean, and off the coast of California.—Some English writers give the name of shearwater to the web-footed birds of the genus *rhynchops* (Linn.), more properly called skimmers.

**SHEATHBILL** (*Chionis*, Forst.), a genus placed by Gray among the gallinaceous birds, but by Latham, Cuvier, and Van der Hoeven among the waders. The bill is short, strong, compressed toward the tip, the culmen curved, and the base covered with a movable horny substance, more or less concealing the nostrils; base of bill and cheeks covered with a warty naked skin; wings moderate, the 2d quill the longest, and the bend with a blunt knob; tail moderate and even; tarsi short, strong, covered with small rough scales; toes moderately strong, with transverse scales, the outer united to the middle one by a membrane at the base, and the hind one small, elevated, and on one side; claws short and blunt. The white sheathbill (*C. alba*, Forst.) is from 15 to 18 inches long; the plumage is pure white, the bill and knob of wing black; the legs bare a little above the joint, and reddish. It is found in New Zealand, New Holland, and the islands of the Antarctic ocean, where it frequents the shores in flocks, searching for food, which consists of mollusks, sea weeds, and animal remains cast up by the waves; numbers have sometimes been seen by southern voyagers in the open sea at a great distance from land, resting on icebergs and feeding on the refuse matters thrown up by the waves. The flight is like that of the pigeon; the flesh is said by most voyagers to be excellent food. The smaller sheathbill (*C. minor*, Hartl.) is also white, and is of about the size and proportions of a domestic pigeon, except in the broad and sheathed bill; this is said to be found off the southern point of South America. With the general appearance of a gallinaceous bird, the sheathbill has the habits of a wader.

**SHEBA**, or **SABA**, in ancient geography, the capital city of the Sabæans in Arabia Felix. Its exact site is unknown. The territory of the Sabæans lay near the Red sea, but its precise boundaries cannot be ascertained. They were, partly at least, Semitic tribes, monarchically governed, the first child born in a certain number of noble families after the accession of a monarch being the presumptive heir to the throne. They held for centuries the keys of the commerce between Europe and India, and Egypt and Syria, produced and sold frankincense and aromatics, and were reputed for their opulence and luxury among the Hebrews, Greeks, and Romans. A queen of Sheba was attracted by the fame of Solomon to visit Jerusalem. (1 Kings x. 1-18.) The ancient geographers gave

extravagant descriptions of the natural wealth of the country; the traveller Niebuhr was the first to assert that it could never have produced gold, and that some of its finest spices and perfumes were probably imported.—The name of Saba was given by classical writers to other cities both on the Arabian and Ethiopian sides of the Red sea. In the Hebrew Scriptures, in contradistinction from the Arabian Sheba, the region of the Ethiopian Sabæans is called Seba.

**SHEBOYGAN**, an E. co. of Wis., bordering on Lake Michigan, drained by Sheboygan river and its tributaries, and by branches of Milwaukee river; area, 500 sq. m.; pop. in 1850, 8,379; in 1860, 26,848. In 1850 the productions were 29,487 bushels of wheat, 36,979 of oats, 37,206 of potatoes, 1,757 tons of hay, and 52,885 lbs. of butter. There were 4 grist mills, 6 saw mills, 4 newspapers, and 7 churches. Limestone of excellent quality abounds, and it is well supplied with water power. The Milwaukee and Green Bay railroad passes through the county.—**SHEBOYGAN**, the capital, is situated on Lake Michigan, at the mouth of Sheboygan river, 60 m. N. from Milwaukee, and 110 m. N. E. from Madison; pop. in 1855, 3,600. It was first settled in 1836. It has a good harbor, and large quantities of timber are shipped by lake vessels. The Milwaukee and Green Bay railroad passes through the place. The village of Sheboygan Falls, on the river, is 6 m. distant.

**SHEE**, **SIR MARTIN ARCHER**, an English painter, born in Dublin, Dec. 23, 1770, died in England, Aug. 13, 1850. He was introduced in 1788 to the notice of Sir Joshua Reynolds by Edmund Burke, and in the same year became a pupil in the royal academy, to the exhibition of which he contributed his first pictures in 1789. Although by no means the best portrait painter of his time, he was, with one or two exceptions, the most fashionable, his suavity of manner procuring him titled sitters in great numbers. Lawrence however had the monopoly of the ladies. In 1798 he was chosen an associate, and in 1800 a member of the royal academy, and in 1830 he succeeded Sir Thomas Lawrence as president, on which occasion he was knighted. Leslie, who opposed his election as president, says he discharged the duties of the office in an "incomparable manner." He also aspired to literary distinction, and in 1805 and 1809 published 2 parts of a poem entitled "Rhymes on Art," in 1814 "The Commemoration of Sir Joshua Reynolds, and other Poems," and in 1824 "Alasco," a tragedy forbidden to be acted by the licenser from its liberal sentiments, and consequently printed by the author, who got £500 for the copyright. None of these made much impression on the public. His life has been written by his son (London, 1860).

**SHEEAHS**, or **SHITES**, a term signifying heretics, applied by the Soonnees or orthodox Mohammedans to those who believe that Ali was the first lawful successor of Mohammed.

Immediately after the death of the prophet a dispute broke out among the faithful as to who should succeed him as head of the church. A strong party was in favor of Ali, the son-in-law of Mohammed by his marriage with the prophet's only daughter Fatima; but the party that supported his rivals, Abubekr, Omar, and Othman, succeeded in elevating them to the caliphate before Ali, who did not attain that position till 23 years after the death of Mohammed. The Sheeahs maintain that he was the rightful successor, and that the three first caliphs were usurpers. Other points of difference have since sprung up. The Sheeahs place Ali on a level with Mohammed, while their opponents exalt the prophet above every other human being. The Sheeahs also reject such of the traditions of Islam as relate to the first three caliphs or any other enemies of Ali, and they accept certain traditions which are not considered orthodox by the Soonnees. To the common formula of faith: "There is no God but Allah, and Mohammed is his prophet," they add: "Ali is the vicar of God." The Sheeahs are the dominant sect among the Persians, who consequently are held in abhorrence by the orthodox Turks and Arabs. The Persians to this day celebrate with singular displays of rage and sorrow the anniversary of the martyrdom of Hoosein, the son of Ali, who was put to death in 680 by the followers of Yezid, the 7th caliph. He and his lineal descendants for 9 generations are among the 12 imams whom the Persians reverence as the fathers of Islamism.

**SHEEP** (*ovis*, Linn.), a genus of hollow-horned, wool-bearing, ruminating animals, characterized by horns common to both sexes in the wild state (though sometimes wanting in the females), large, angular, transversely wrinkled, yellowish brown, curved backward, laterally, and spirally, the tip coming forward, and with a porous bony axis; the forehead is arched, the lachrymal sinus distinct, and muzzle hairy; there are no inguinal pores and no beard under the chin; mammae 2; ears small, legs slender, and tail short; the hair is of two kinds, one woolly, the other exterior, closer, and harsher. In a domesticated state the wool predominates over the hair, the horns vary or disappear, the ears and tail lengthen, and other characters undergo great modifications. Though the sheep is externally sufficiently distinct from the goat, in general appearance, covering, and horns, the generic differences are not so evident when the whole series of these animals is examined; they run into each other so closely that some naturalists have included them in a single genus. They differ from the goat (*capra*) chiefly in the form of the horns, absence of beard, and presence of an opening on the anterior part of each foot between the hoofs, whence issues a sebaceous secretion; the males are not odorous as in the goat. They are gregarious, timid, defenceless, and more dependent on man's care than the goat; they

inhabit the mountainous regions of temperate climates, and, though less active than the goats, climb rocks and precipices with facility and speed. Some naturalists count 4 or 5 distinct species, one of which is found native in each continent; there are few parts of the globe except the polar regions where some breed of the sheep is not found; they thrive remarkably in temperate Australia, producing fine fleeces; in the tropics the wool degenerates into hair. In the skeleton the parietal bone is in the form of a flattened band, encircling the cranium between the orbital wings of the sphenoid, and is narrower than in the goats; frontals large and broad; squamous portion of temporals small, and the tympanic bullae large, terminating anteriorly by a sharp styloid process; nasals long and convex, forming a single V-shaped bone; ascending portion of intermaxillaries at a very oblique angle, and the incisive openings very large and elongated; infraorbital opening on a line with the 2d premolar; lachrymals large, articulating with the nasals; malar bones broad, thick, and much prolonged on the cheek; palate bones largely developed, deeply notched posteriorly. According to Cuvier there are 46 vertebrae, of which 7 are cervical, 13 dorsal, 6 lumbar, 4 sacral, and 16 caudal. The intestinal canal is very long and simple, the small intestine very much convoluted, and the large of nearly the same size, the whole 28 times as long as the body; the stomach compound; hepatic duct enormously large; brain elongated, narrowed in front; organ of smell highly developed. (For other anatomical details, see **RUMINANTIA**.) The dental formula is: incisors  $\frac{3}{3}$ , canines none, molars  $\frac{3-2}{3-2}$ ; they begin to change their teeth in the 1st year, and have got all their permanent teeth at 3 years, except the outer 2 incisors; the last, according to Owen, in the lower jaw, represent canines, as shown by the analogy of the camels, their lateness of development and peculiarity of form; this holds true in all the *cavicornia* or hollow-horned ruminants.—Sheep are not found fossil, except in the most recent formations, and it would seem as if, with the goats, they were created at about the same time with and for the express use of man, to lead him from barbarism and war to peaceful industry. The ram (*aries*) is one of the signs of the zodiac, and was held sacred as typifying the attributes of the gods; Jupiter was often portrayed with the horns of a ram, as was also Osiris or the sun in spring; it was sacred to some of the ancient divinities, and was sacrificed on their altars. In the Christian dispensation the lamb is the emblem of the pure and innocent Jesus bearing the cross and sins of mankind; it is frequently alluded to in the Scriptures as the symbol of innocence, gentleness, and weakness. Sheep formed the principal wealth of the Hebrew patriarchs, and the term *pecus* (cattle) of the Latins, whence was derived *pecunia*, wealth, was applied especially to them; they came into N. and W. Europe long after the

goat, and there is no evidence of their crossing the Rhine or upper Danube until about the time of the fall of the Roman empire, though they then existed in S. Europe; it is generally believed that the fable of the Argonauts and the golden fleece rests upon the facts connected with the first importation of sheep into Greece. The ancients believed that sheep and goats could produce a prolific offspring together, and eminent modern names may be found both among the advocates and opponents of this belief. This animal in its wild state probably had little if any wool and a short hair, the former being gradually developed by the care of man; mountain regions were evidently the nurseries of the sheep, and even Jason obtained his golden fleece at the foot of the Caucasus. In old times they were bred chiefly for their skins and milk, the last being abundant, agreeable, and highly nutritious; their flesh was not a favorite article of food. Now they are valued most for their wool, flesh, and fat; their flocks well managed carry fertility wherever they go, the droppings being richer than any other manure except that of fowls; they are even employed as beasts of burden in the mountains of India; the skins are used for garments, in the form of leather for gloves and bookbinding, and for various other purposes; the wool is consumed in the manufacture of many kinds of fabrics, possessing the property of felting on account of the imbricated scaly surface of the fibres.—The Corsican musmon or moufflon (*O. musimon*, Pall.), placed by Bonaparte in the genus *capra* on account of the absence of interdigital glandular openings, and the type of the genus *caprovis* from its resemblance to a goat, grows as large as a small fallow deer, and has horns of very great size; it inhabits the mountains of Corsica, Sardinia, the southern part of Spain, European Turkey, and the eastern Mediterranean islands, where however it is comparatively little known. The head is long, with compressed muzzle, swollen forehead, and large, erect, and sharp ears; the horns of the male are long and triangular, comprising more than half a circle, their bases occupying almost all the forehead and separated only by a small space; they grow gradually smaller to the obtuse tip, with transverse wrinkles and raised rings; the body is large and muscular, the tail with 12 vertebrae, turned down and bare on the under side; the legs long and muscular, and the hoofs short; there is an appearance of a moderate dewlap. The general color is yellowish, with a chestnut tinge, deepest on the neck; head ash-gray; muzzle, space about eyes, interior of ears, abdomen, inside of thighs, edges of tail and end of legs, white; horns ochrey brown; the under wool is ash or rusty white, and the hair is darker and thicker in winter; the females are without horns, or with very small ones. The average size is about 4 feet in length and 32 inches in height; there is sometimes a tuft under the chin, and other

marks also indicate it to be intermediate between sheep and goats. They are seen in flocks of 100 or more, headed by an old male; they breed with the domestic races, and have been themselves domesticated, losing their natural timidity; they are hardy, and require little care; their sense of hearing is very acute; the females and young males are gentle and docile, but the old males are often unruly and savage, fighting fiercely with each other, and putting to flight bulls, foxes, and dogs.—The Asiatic argali (*O. Ammon*, Cuv.) is a large and powerful animal, the male standing 3 feet high at the shoulders and weighing 200 lbs.; the horns 4 feet in their curve, with a weight of 30 lbs. The fur is short, fulvous gray in winter, with a ferruginous or buff dorsal stripe, and a light brown anal disk; it is more rufous in summer. It inhabits the highest mountain ranges of Asia, the Caucasus, and the plains of Siberia; its flesh is much esteemed, and in Russia the skins are still used as articles of dress; though wild and watchful in a state of nature, it is easily domesticated, and is generally believed to be the source of some of the eastern breeds of sheep; the females have small horns, and are said to breed in spring and autumn. Tilesius favors and Bojanus opposes the derivation of domestic sheep from this species. The African argali or bearded sheep (*O. tragelaphus*, Cuv.), the aoudad and *ammotragus* of some authors, is another species intermediate between the sheep and goats, having the interdigital glands of the former, and the absence of lachrymal sinuses of the latter; it is  $\frac{1}{2}$  larger than the European sheep, with a tail about 7 inches long, ending in a pencil of hairs; the horns are small in comparison with the size of the body, and rather smooth. The color is uniform reddish yellow, with dorsal stripe and anterior part of limbs brownish; under parts and inside of limbs whitish; the anterior parts of the neck, body, and legs are furnished with hair 6 to 12 inches long. It inhabits the mountains of N. Africa, from Abyssinia to Barbary, in small flocks; it is fierce, and bravely defends itself. America has also an argali, the Rocky mountain sheep (*O. montana*, Cuv.), called big-horn from the great size of the horns; it is found in flocks of 3 to 30, from the upper Missouri and the Yellowstone river to the Rocky mountains and the high grounds on their eastern slope, as far S. as the Rio Grande, E. to the Mauvaises Terres of Nebraska, and W. to the coast ranges of Washington territory, Oregon, and California; it is said to range as far N. as lat. 68°, but is not found in the hilly regions near Hudson's bay. None of the domestic breeds have been traced to this, though it would no doubt cross with them; the effect of all domestication is to improve the fleece, shortening the hair and increasing the wool, and careful breeding with this cross in a milder climate would probably in a few generations cause the coarse hair to disappear, and render the fine fleece long enough for the finest fabrics; the



experiment is worth trying, as a successful result would be of great national importance.—The musmon of Corsica and the Asiatic argali, though differing somewhat in the skeletons from the domesticated races, have generally been considered as their most probable origins. The keeping of sheep is one of the primitive and most common of human occupations; their early domestication and subjection for centuries to varied climates and circumstances, have so modified their forms that it becomes exceedingly difficult, if not impossible, to determine the original stock. It may be that in the sheep, as in the ox, dog, horse, and other domesticated animals, the wild representative may no longer exist, having disappeared during their long period of domestication. The domestic sheep (*ovis arica*, Linn.), from whichever of the preceding it be derived, presents a great variety of breeds, only a few of the principal of which can be noticed here. Among the African sheep is the Fezzan breed, remarkable for the long legs, pendulous ears, arched forehead, and short, curled, and crispy fleece, like a mane on the neck and whorled on the shoulders; the usual colors are black and white. Nearly allied to this is the Persian sheep, with black head and neck, and the rest of the body white; it is very docile and affectionate. From the last or the Fezzan seem to have sprung the Morocco, Congo, Guinea, and Angola breeds; H. Smith figures a variety called the Zunu or goitred breed, having a high collar of fat behind the horns and a goitre-like fatty mass on the larynx. There are several breeds of large-tailed or fat-rumped sheep in S. Africa, extending over that continent and also to Asia; the Hottentot or broad-tailed breed is below the medium size, with short and soft fleece, and two large masses of fat on each side of the lower part of the tail, which are so esteemed as a delicacy that various contrivances are used to prevent them from dragging on the ground; the fat-rumped sheep of Tartary and temperate Asia (*O. steatopyga*) has a similar growth of fat upon the croup, and long and pendulous ears; the reason of this accumulation of fat, sometimes 70 to 80 lbs., has not been satisfactorily determined, though it is generally attributed to some peculiarity of feeding.—The most important breed of sheep as regards the texture of the wool is the merino (*O. Hispanica*), in modern times brought to the greatest perfection in Spain, though their originals probably formed the flocks of the patriarchs thousands of years ago, and have been the stock of all the fine-wooled sheep. Unlike the British breeds, they have wool on the forehead and cheeks; the horns are very large and heavy, and convoluted laterally; the wool is fine, long, soft, twisted, in silky spiral ringlets, and naturally so oily that the fleece looks dingy and unclean from the dust and dirt adhering to the outside, but perfectly white underneath; the form is not so symmetrical as in many English breeds, and there is generally a

loose skin hanging from the neck. They are kept in the milder regions in winter, and are transferred to the most favorable localities for shearing and grazing; they are most hardy in the Pyrénées. According to Mr. Young, in the best mountain pastures the soil is stony, and clover is scarce; it would seem that neither the soil nor the herbage has any thing to do with making these heights suitable for this breed, and probably any high range of dry land would suit them, whatever plants were there growing. They are brought every night to a sheltered level valley, but are never housed nor under cover; 4 shepherds and 6 large dogs are sufficient for 2,000 sheep; the dogs can easily master a wolf, alone protect the flock at night, and are fed only on bread and milk; most of these sheep have the horns removed. The legs are white or reddish; the face is in some speckled, and in others white or reddish; they are sometimes black; though the legs are short, they are excellent travellers; the shape is good, the back flat and straight, and the body round; they have in a remarkable degree the mellow softness under the skin which Bakewell considers an indication of a disposition to fatten in any breed; they are extremely docile. The average fleece is 4 to 5 pounds; several million pounds are annually exported from Spain. They readily form cross breeds, called demi-merinos, which have been brought to great perfection in France, whence, as well as from Spain, they have been imported into America. Other fine-wooled varieties of the merino are the Saxon, Silesian, and Flemish breeds, the last abundant in France and the Netherlands, and generally hornless, high on the legs, and mixed with the Barbary long-legged variety. In the Cretan breed the horns ascend directly upward with a spiral turn; in the Wallachian they are large, but diverge nearly at right angles from the head; in the many-horned Iceland sheep (*O. polycerata*), almost in a state of nature, beside the naturally placed horns, there are from 1 to 8 others, usually on the sides of the head; a similar anomaly occurs in some of the Scottish and Asiatic breeds. The Astrakhan or Bokharian breed has a fine spirally twisted wool, and furnishes a great portion of the lamb skins so highly valued by furriers; it is generally a mixed black and white; in the very young each lock is divided into 2 small twisted curls. The Caucasian breed (*O. dolichura*) is a very handsome animal, resembling some of the Spanish and English varieties; the males are horned, the wool of the adults coarse, and the tail, which consists of 20 vertebrae, is covered with a fine wool, which drags on the ground; they are generally white; by gentle pressure on the wool by linen coverings as the lamb grows, and by pouring warm water over it daily, it is made to lie in beautiful glossy ringlets, constituting a delicate fur much esteemed for lining robes and dressing gowns; the black is most prized. The Mysore breed

of India is without horns, with pendulous ears, short tail, and very fine wool, curled in small meshes and twisted like a corkscrew.—There is no country where more attention has been paid to the improvement of the breeds of sheep, both domestic and foreign, or where more success has been attained, than Great Britain; there are very valuable British breeds suited for the rich soil, luxuriant pastures, and mild climate of southern England, the thinner soil and rich grasses of the upland counties, and the alpine herbage and cold weather of the Scottish highlands; looking to a combination of advantages, hardier nature, excellence of meat, and quality and quantity of wool, some of the English breeds take the first rank for the small farmer. The Leicester or Dishley breed is the most esteemed of the long-woolled sheep of England, and is extensively reared on the rich and lower pasture lands. It may be known by the clean head without horns, lively eyes, straight, broad, and flat back, round body, small bones, thin pelt, disposition to make fat at an early age, and a fine-grained and well flavored flesh. It was once known as the Lincolnshire breed, noted for the quantity of the wool and the coarseness of the mutton; Mr. Bakewell effected the improvement in the breed, with great profit to himself and advantage to the wool-growing interest of his country; it has extended to the south of Scotland, and a few are kept by almost every small farmer for the wool; the fleece is abundant, the flesh excellent, and the habits docile and home-loving; a valuable breed has sprung from its mixture with the black-faced and Cheviot varieties. The black-faced or heath breed extends from the N. W. parts of Yorkshire to the highlands of Scotland, especially on the W. coast; it is active, hardy, almost goat-like in its climbing habits, with a compact shape and bright, wild-looking eyes; the horns of the male are very large and convoluted; the wool is long, coarse, and shaggy, and the face and slender legs always jet black; in some mixed breeds the face and legs are brownish spotted with black; the flesh is fine-grained and of excellent flavor, but the wool is comparatively unprofitable, the Cheviot, another northern breed, being generally preferred as equally hardy and better fleeced. Many attempts have been made to improve it, and the Norfolk, Suffolk, and Dorset breeds are supposed to be derived from it. In the Cheviot the head is bare and clean, the face and legs white, the body long, bones small, and fleece of about 3 lbs.; the Dorset is an old but handsome breed, with strong and well formed body, finely curved horns, and clear white fleece; they drop their lambs as early as September. The Southdown breed is dark-faced, without horns, with long small neck, very short and fine fleece of 2½ to 3 lbs., and celebrated for the fine flavor of the mutton; it is in the greatest perfection in Sussex, on the chalky downs. Other British breeds without horns and with white face and

legs are the Teeswater, Dartmoor, Hereford, and Romney Marsh; and with horns, the Exmoor and Spanish. In the Hebrides, Shetland, and other British islands are the dun-faced and Zetland breeds, the former with yellowish face and legs, and both having a fine wool; these are the smallest of the genus, of a thin lank shape, short straight horns, and very short tail; the wool is of various colors, black, white, grayish, brownish, or blotched with 2 or 3 of these; in the low islands and on favorable pastures the wool is exceedingly fine, and it is the coarsest in the most mountainous islands; the horns may be 4 or even 6. The number of sheep in the British islands from 1830 to 1860 has varied from 80,000,000 to 55,000,000.—America has no indigenous domestic sheep, but has paid considerable attention to the preservation and improvement of breeds brought from Europe. Both Spanish and French merinos have been introduced into the United States, the former by the Hon. David Humphreys, minister to the court of Madrid, in 1802, and the latter by Mr. Taintor, of Hartford, Conn., in 1846; it is said that 3 Spanish merinos were brought to Boston in 1793 by Mr. William Foster, but they were not preserved for breeding purposes. The first sheep were introduced into the United States at Jamestown, Va., from England in 1609, which in 40 years had increased to 3,000; they were introduced into New York and Massachusetts about 1625. The merinos are hardy, yielding a large amount of fine wool for their size, the males 10 to 16 lbs. of washed wool, and the females 4 to 8, the former weighing from 140 to 175 lbs., the latter 80 to 130. They thrive in summer on grass and clover, and in winter on hay, wheat bran, barley, oats, and root crops; in winter they require sheds for protection, free space, pure air, and water accessible. Many parts of the United States are well adapted for them, and the best breeds are generally considered to be the Vermont Brewer and Atwood flocks; some regard the Saxon merinos as the best, and the French have less oil in their wool than the Spanish. The Leicester breed has a heavier fleece and carcass, but requires more food; as combining the advantages of wool and meat, this is the best breed for the farmer, and is excellently bred in New Jersey; the wool is long staple, and is used mostly for combing purposes, for delaines and similar cloths. The Southdown are by many preferred to the merino, as a third larger, hardier, and better mutton; they are very prolific, and the lambs are hardy; the wool is large in quantity and fair in quality. The Cotswold is another highly esteemed breed. As a general rule, the fine-woolled sheep, like the merino, Saxon, French, and Silesian, are not so profitable for the mutton as the coarse-woolled, like the Leicester, Southdown, and Cotswold; it seems impossible to combine in a single breed both these desired qualities in their greatest perfection; as above stated, the Leicester may

be considered as the best for the small farmer. The northern and western states raise the best sheep for mutton, and the middle and southern for wool.—Sheep are remarkably affected by changes of external condition, as of climate, food, &c., and congenital varieties thence arising may be easily perpetuated. In Massachusetts in 1791 a lamb was born with a longer body and shorter legs than the rest of the flock, with longer joints and crooked fore legs; as it could not leap over fences, it was determined to propagate its peculiarities, and from it arose the famous otter breed; when both parents are of the otter breed, the lambs inherit the form. Sheep are subject to many diseases, of which the most troublesome is the foot rot, from suppression of the secretion of the gland between the hoofs, and consequent inflammation, generally caused by standing on too wet ground; the best remedy is to pare the diseased hoof thoroughly and apply to it a solution of blue vitriol (sulphate of copper), 1 lb. to a quart of water; the animal should also be kept in a dry place. They suffer from insects, especially a bot fly (*œstrus ovæ*), whose larvæ get from the lips and nostrils into the frontal and maxillary cavities, causing fatal disease; the wild sheep of elevated regions suffer least from these. They are infested with a species of tick, which may be killed after shearing by a weak solution of tobacco and water, or a preparation of oil, lampblack, and umber. Sheep are more choice in their food than goats, and yet will thrive where most other animals would starve; they prefer alpine and aromatic plants, and will soon clear a field of weeds, briars, and bushes, and by their droppings prepare it for the plough. They cannot be economically kept amid a dense population, as they would occupy too much land which could better be devoted to the growth of edible products; there are immense tracts of waste land in the United States admirably adapted for all the breeds of sheep; they are not profitable to pasture with cows, as they bite the grass too close for the latter to thrive upon. The great drawbacks to the keeping of sheep by small farmers are the absence of suitable fences and the loss from the attacks and worryings of dogs; the former could be easily remedied, and the latter demands the interference of legislators.—For full information on the statistics and profits of sheep husbandry the reader is referred to the agricultural reports of the patent office since 1850, and the publications of the various state agricultural societies for the last 10 years. It need only be stated here that lambs may be weaned at from 2 to 3 months; that the female is fit for procreation at 1 year and the male at 1½; that gestation lasts about 5 months; that 1 or 2 young are born at a time; that one male may be kept to 30 females; and that they can produce till the age of 10 or 12, and be fattened with the best advantage at 8 years. In 1840 there were about 19,380,000 sheep in the

United States, in 1850 21,750,000, and in 1860 not far from 25,000,000, less than half of the number in Great Britain; at \$2 each they represent a value of \$50,000,000, and would yield about 75,000,000 lbs. of wool, about one third of the whole amount here consumed in manufactured products; with the average price of wool the country would have been saved more than \$30,000,000 if the farmers had kept a full supply of sheep. The meat is wholesome and nutritious, and always finds a ready market; New York city alone consumes about 15,000 sheep a week.

**SHEEP'S HEAD**, a spiny-rayed fish of the family *sparidae* and genus *sargus* (Cuv.); the scuppaug (*pagrus*) belongs to the same family. The gill covers are unarmed, the palate toothless, the jaws not protractile, and the scales large; the front incisors are cutting, almost like those of man, and there are several rows of rounded molars. This fish (*S. ovis*, Cuv.) is about 20 inches long, though some are said to grow considerably larger; the ground color is light gray, with 6 distinct, dark brown, transverse bands, broad and nearly equidistant from each other, and another across the neck; the head is much darker, the gill covers with silvery and golden reflections, throat somewhat reddish, and irides golden; scales with dark margins; the pectorals nearly colorless, the other fins blackish brown. The body is short and thick, and the back rounded; lips large and fleshy, jaws equal, eyes large, and nostrils high on the head and double; the 1st 12 rays of the dorsal and 1st 3 of the anal strongly spinous, pectorals very long, ventrals stout, with spinous process at base and 1st ray spinous; air bladder large. The form of the head and blackness of the face give it a slight resemblance to the physiognomy of the sheep. It is found in considerable numbers in summer off the New York coast, and is caught readily in nets and seines; it is difficult to take with the hook, as the line is very liable to be cut off by the sharp incisors; its food consists of mollusks and crustaceans. It is a very delicious fish, in the time of Dr. Mitchell commanding a higher price than any other except fresh salmon and trout; according to De Kay it holds the same rank with New York epicures as the turbot does in Europe. It much resembles the species found in the Mediterranean; several other allied species are met with from New York to New Orleans.

**SHEERNESS**, a town of Kent, England, at the N. W. end of the island of Sheppey, on the river Medway at its junction with the Thames, 47 m. E. by S. E. from London; pop. in 1851, 8,549. There is here an extensive naval establishment, defended by heavy batteries, the dockyard and buildings in connection with which, including all the necessary establishments for building or repairing ships, occupy 60 acres. The trade depends principally upon the dockyards. In the time of the commonwealth the ground on which Sheerness stands

was unoccupied, and after the restoration a small fort was commenced, but the Dutch destroyed it in 1667. Soon afterward it was restored and the dockyard commenced.

SHEFFIELD, a town and municipal and parliamentary borough in the west riding of Yorkshire, England, at the junction of the Sheaf and 3 smaller streams with the Don, 162 m. N. N. W. from London; pop. in 1861, 185,157. The streams which unite here all have their source in the high lands W. S. W. and N. W. of the town, and supply a large amount of effective water power for manufacturing purposes. The valleys through which these streams flow are bounded by high hills, which make many of the streets steep, though they add to the picturesqueness and beauty of the town. Generally, however, the streets, except in the oldest portions, are wide and well built, and the suburbs are occupied by the residences of the manufacturers and richer tradesmen. The town is well paved, and lighted with gas, and the rivers are crossed by fine bridges. There are 70 places of worship, of which 26 belong to the established church. The higher educational institutions of Sheffield are the people's college, with day and evening classes, the church of England institute, also a very successful school, the Wesley college, the collegiate school, the old endowed grammar school, the mechanics' institution, and the government school of art, one of the best conducted in England. Its benevolent institutions are numerous and well sustained. The town, partly from the want of suitable drainage and partly from the unhealthy character of some of the occupations, has a higher rate of mortality than that of most of the large towns of England.—It has intercourse with other parts of the country by a canal and two railways. Sheffield, renowned for its knives in the time of Chaucer, is still the chief seat of the English manufacture of cast, shear, and blister steel of all kinds, steel wire, cutlery and tools of almost every variety, railway and carriage springs and buffers, and many other kinds of steel and iron ware, as well as all classes of silver, silver-plated, electro-plated, German silver, britannia, and other white metal goods. Britannia metal and the process of silver-plating were invented here. Snuff is also largely produced, famous for its good quality. The cutlers' company had its origin in the 16th century, and was incorporated by statute in the reign of James I. Its restrictions, which interfered with the prosperity of the trade, were mitigated in 1801, and wholly abolished in 1814. It is the trustee of several important charities, beside which its only duties are the granting of trade marks to cutlers.—Sheffield was an old manor of the earls of Shrewsbury, who had a castle in the town, and a manor house in a park a mile east, in one or the other of which the greater part of the captivity of Mary, queen of Scots, was passed. The castle was demolished in 1648 by order of parliament, and the park divided into

farms in 1707. The town was empowered to send 2 members to parliament in 1832, and in 1843 was incorporated as a municipal and parliamentary borough. Its chief growth has been during the last 60 years, and in 1811 it had but 35,000 inhabitants.

SHEFFIELD, JOHN, duke of Buckingham. See MULGRAVE.

SHEIK (Arabic, the eldest), the chief of an Arab tribe. The title is also applied to the heads of Mohammedan monasteries and to the higher order of religious preachers, as the mufti of Constantinople, who is sometimes called *sheik ulislam*, chief of the true believers. Many sheiks, particularly of the Bedouin tribes, claim a long line of ancestors; and the sheik of Mecca, in consideration of his alleged descent from Mohammed, demands presents from all caravans arriving in that city.

SHEIL, RICHARD LALOR, an Irish author and orator, born in Drumdowney, near Waterford, Aug. 17, 1791, died in Florence, May 23, 1851. He was educated at the Jesuit school of Stoneyhurst, Lancashire, and at Trinity college, Dublin, where he took his degree of B.A. in 1811. Soon afterward he entered himself a student at law in Lincoln's Inn, and in 1814 was called to the bar, and eked out his slender income by writing for the stage. Between 1814 and 1822 he produced 6 dramas, "Adelaide" (1816), "The Apostate" (1817), "Bellamira" (1818), "Evadne" (1819), founded on Shirley's "Traitor," "Montoni" (1820), and "The Huguenot" (1822), all of which, with the exception of the last named, obtained a decided success. In 1822 also appeared the first of a series of "Sketches of the Irish Bar," since collected and edited by R. S. Mackenzie (2 vols. 12mo., New York, 1854; London, 1855), and which are among his most successful literary performances. About this time he began to be known in Ireland and England as a political orator and agitator, and also by his forensic efforts at the bar. In 1830 he entered parliament, and almost immediately took his place as the most brilliant and impulsive speaker (with the exception perhaps of Lord Stanley, the present earl of Derby) in that body, a position which he retained until his retirement from public life. After seconding O'Connell in the repeal agitation, he accepted a sinecure office under the Melbourne ministry, and in 1839 was made a privy councillor. He was appointed master of the mint by the Russell ministry, and in 1850 accepted the mission to Florence. His memoirs have been written by W. T. McCullagh (2 vols., London, 1855).

SHEKEL (Heb., weight), the Hebrew unit of weight, and hence, as payments were originally made by weight, also of money. It was probably equal to about 218 grains, or  $\frac{1}{2}$  oz. avoirdupois, which is the weight of the earliest coin of the name known, the silver shekel of Simon Maccabæus. Its value, as differently stated, was from 50 to 62½ cts. The golden shekel was of half this weight, and worth about

§4. Both as weight and money it was divided in reckoning into the beka, reba, and gerah, respectively  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$  shekel. There are two standards of weight mentioned in the Scriptures, the sacred and the royal shekel, the difference between which cannot now be precisely ascertained, but is supposed by Michaelis to have been as 5 to 3.

SHELburnE, a S. W. co. of Nova Scotia, bordering on the Atlantic and the bay of Fundy, and intersected by Tusket, Jordan, Sable, and Clyde rivers; area, 565 sq. m.; pop. in 1851, 10,622. Good harbors are found at the outlets of the rivers, and numerous islands are scattered along the coast. In the N. E. is Blue mountain; the surface is generally broken and the soil stony. The fisheries employ a large portion of the population. Capital, Shelburne.

SHELby, the name of counties in 9 of the United States. I. A central co. of Ala., bounded E. by the Coosa river and intersected by the Cahawba; area, 970 sq. m.; pop. in 1860, 12,618, of whom 3,622 were slaves. The surface is hilly, with considerable forests, and the soil is well watered and highly fertile. The productions in 1850 were 384,389 bushels of Indian corn, 67,763 of sweet potatoes, 51,909 of oats, and 3,737 bales of cotton. There were 3 grist and 3 saw mills, and 992 pupils attending public schools. Coal and iron ore abound, and there are several mineral springs. Capital, Columbiana. II. An E. co. of Tex., bordering on La., bounded E. by the Sabine and W. by the Attoyac river; area, 850 sq. m.; pop. in 1860, 5,362, of whom 1,476 were slaves. The surface is generally level and the soil rich. The productions in 1850 were 790 bales of cotton, 99,518 bushels of Indian corn, 40,784 of sweet potatoes, and 63,435 lbs. of butter. There were 3 saw mills, 6 churches, and 213 pupils attending public schools. Capital, Shelbyville. III. A S. W. co. of Tenn., bordering on Miss., bounded W. by the Mississippi river, which separates it from Arkansas, and intersected by Loosahatchee and Wolf rivers; area, 510 sq. m.; pop. in 1860, 48,091, of whom 16,950 were slaves. The surface is level and the soil very fertile. The productions in 1850 were 20,741 bales of cotton, 837,827 bushels of Indian corn, 107,328 of sweet potatoes, 76,108 of oats, and 163,042 lbs. of butter. There were 10 flouring and 15 saw mills, 5 tanneries, a furnace, 11 newspapers, 43 churches, and 1,810 pupils attending public schools. The Memphis and Charleston, Memphis and Ohio, and Mississippi and Tennessee railroads terminate at Memphis in this county. Capital, Raleigh. IV. A N. co. of Ky., drained by Beech and other large creeks; area, 465 sq. m.; pop. in 1860, 16,436, of whom 6,634 were slaves. The surface is hilly and diversified with fine forests, and the soil very rich. The productions in 1850 were 1,731,740 bushels of Indian corn, 83,931 of wheat, 188,956 of oats, 1,022 tons of hemp, and 60,176 lbs. of wool. There were 40 grist and 14 saw mills, 5 tanneries, 45 churches, and

813 pupils attending public schools. The Louisville and Lexington railroad intersects the county. Capital, Shelbyville. V. A W. co. of Ohio, intersected by the Miami river; area, 425 sq. m.; pop. in 1860, 17,493. The N. part is level, the S. undulating, and the soil fertile. The productions in 1850 were 439,798 bushels of Indian corn, 89,109 of wheat, 108,870 of oats, 47,534 lbs. of wool, and 7,205 tons of hay. There were 2 newspapers, 4 flouring and 4 saw mills, 3 tanneries, a foundry, a woollen factory, 25 churches, and 2,597 pupils in the public schools. It is intersected by the Miami canal and two railroads. Capital, Sidney. VI. A S. E. co. of Ind., drained by the Blue river and numerous other streams; area, about 400 sq. m.; pop. in 1860, 19,571. The surface is level and the soil fertile. The productions in 1850 were 1,231,884 bushels of Indian corn, 118,820 of wheat, 54,776 of oats, 3,892 tons of hay, and 48,333 lbs. of wool. There were 20 flouring and 17 saw mills, 28 churches, 1 newspaper, and 538 pupils attending public schools. The Lawrenceburg and Mississippi railroad passes through the county. There is good water power and abundance of timber. Capital, Shelbyville. VII. A S. E. co. of Ill., intersected by the Kaskaskia and Little Wabash rivers; area, 790 sq. m.; pop. in 1860, 14,635. The surface is almost level, including a part of the Grand Prairie, and the soil fertile. The productions in 1850 were 757,382 bushels of Indian corn, 21,998 of wheat, 96,504 of oats, 124,943 lbs. of butter, and 27,208 of wool. There were 18 grist and 4 saw mills, a tannery, 10 churches, and 869 pupils attending public schools. It is traversed by the Illinois central and the Terre Haute, Alton, and St. Louis railroads. Capital, Shelbyville. VIII. A N. E. co. of Mo., intersected by the North fork of Salt river and the South Fabius river; area, 500 sq. m.; pop. in 1860, 7,301, of whom 724 were slaves. The surface is moderately hilly, and the soil good. The productions in 1850 were 278,435 bushels of Indian corn, 22,477 of wheat, 33,718 of oats, 67,655 lbs. of butter, and 14,446 of wool. There were 5 grist and 2 saw mills, 5 churches, and 1,051 pupils in public schools. Bituminous coal and limestone are abundant, and timber is scarce. Capital, Shelbyville. IX. A W. co. of Iowa, intersected by the Nishnabtona river; area, 550 sq. m.; pop. in 1860, 818. The soil is productive. Cattle and swine are largely exported. The productions in 1859 were 1,213 bushels of wheat, 43,605 of Indian corn, 3,396 of potatoes, 875 tons of hay, and 12,409 lbs. of butter. Capital, Shelbyville.

SHELby, ISAAC, an American revolutionary officer, born near Hagerstown, Md., Dec. 11, 1750, died in Kentucky, July 18, 1826. He removed to the West in 1771, and shortly afterward served as a lieutenant in the militia in an expedition against the Indians. When the revolution broke out he was selected as captain of a military company in Virginia, and in 1777 placed in charge of the commissary de-

partment for the frontier militia. In 1779 he was elected to the house of delegates of Virginia. For his bravery at the battle of King's Mountain, Oct. 7, 1780, he received a vote of thanks and a sword from the legislature of North Carolina, of which he was elected a member in 1781 and 1782. Upon the organization of the state of Kentucky in 1792 he was chosen governor, and held the office 4 years, and again from 1812 to 1816. In 1813 he joined Gen. Harrison at the head of 4,000 Kentuckians, and served at the battle of the Thames.

SHELDON, DAVID NEWTON, D.D., an American clergyman, born at Suffield, Conn., June 26, 1807. He was graduated at Williams college in 1830, afterward studied at the Newton theological seminary, and in 1835 was appointed by the board of the Baptist triennial convention missionary to France, where he remained 4 years, chiefly in Paris and its vicinity. The mission not accomplishing as much as he hoped, owing to the position of the French government, Mr. Sheldon returned home, and was for 2 years pastor of a Baptist church in Halifax, Nova Scotia. In the spring of 1842 he became pastor at Waterville, Me., and in the following year president of Waterville college. In 1853 he resigned that office and removed to Bath, Me., where he has since resided. He was pastor of the Elm street Baptist church in that city till 1856, when he was excommunicated from it on a charge of heresy; and in Sept. 1857, he became pastor of the Summer street Unitarian church in Bath. Dr. Sheldon has published occasional sermons, and was for many years a contributor to the "Christian Review." After the change in his theological views, he published a volume of discourses entitled "Sin and Redemption" (New York, 1856).

SHELDRAKE, or SHIELDRAKE, the common name of the river ducks of the sub-family *anatinae* of the genera *tadorna* (Leach) and *casarka* (Bonap.). In *tadorna* the bill is shorter than the head, higher at the base than broad, with culmen concave in the middle, depressed, curved upward at the tip, which is suddenly hooked and has a strong narrow nail; lamellæ slender and widely set; nostrils large, near the culmen; wings moderate, pointed, the 2d quill longest, and armed on the shoulder with a tubercle; tail moderate, nearly even; tarsi strong, shorter than the middle toe; toes short, fully webbed; hind toe elevated, slightly lobed; claws moderate and curved. They are widely distributed over the old world, on the sea coast as well as on rivers and lakes, migrating in winter from the north; they feed on marine plants and worms, crustaceans and mollusks; the nest is made of grass lined with down, and is often placed in the deserted burrows of rabbits and other rodents on the coast; they lay 12 to 14 eggs. The type of the genus is the common sheldrake (*T. vulpanser*, Flem.), one of the handsomest of water fowl, the colors being brilliant and pure, and strongly contrasted. In the male the bill is vermilion; the

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head and upper neck green bounded by a white collar, below which is another of rich chestnut covering the upper breast and back; rest of back, rump, and upper tail coverts white; scapulars nearly black, outer webs of long tertials chestnut, point of wing and its coverts white, primaries dark brown, and speculum green; tail white, tipped with black; abdomen rich dark brown; sides, vent, and under tail coverts white; the length is 24 to 26 inches; the female is smaller and not so bright, and the young are more brownish. The windpipe is about 10 inches long, having on each side at its lower portion a hollow, globular, bony protuberance, generally much larger on one side than the other. It is abundant on the shores of the North and Baltic seas, and is found in most parts of Europe, rarely seen far inland, preferring flat shores and sandy bars and hills; it comes into Great Britain from the north in winter. The note is a shrill whistle; the flesh is coarse, dark, and of unpleasant odor and flavor; the eggs are shining white, 2½ by 2 inches; incubation lasts 30 days, both sexes sitting, and the young follow the mother as soon as hatched; they are easily domesticated, and are often raised by hens; in captivity they may be fed on grain, soaked bread, and vegetables. Yarrell thinks the names are derived from their favorite shell food, and from their frequent use on heraldic shields; they are also called burrow ducks from their common places of breeding, also skeeling geese in Scotland, and sly geese (from their devices for leading intruders from their nests and young) in the Orkney islands. Two other species are found in Australia.—In the genus *casarka* the bill is as long as the head, nearly straight, the width equal to the height at the base, the anterior half depressed, scarcely curved upward at tip, which has a strong and broad nail; wings moderate, the 2d quill the longest; tail short and rounded; tarsi robust, shorter than the middle toe; toes long, fully webbed; hind toe long, elevated, and lobed. The ruddy sheldrake (*C. rutila*, Bonap.) is about the same size as the last, with similar breeding habits; in the male the bill is lead-colored; the head, cheeks, and chin buff, becoming orange brown at the lower part of the neck all round, where there is a ring of black; the back, tertials, breast, and under parts like the head; wing coverts pale buff white; primaries and tail dark leaden gray, secondaries lighter, and speculum brilliant green; the female is rather smaller and lighter colored, with white on the throat and wings, but without the black collar. It is sometimes called collared duck, and ruddy goose; it is a native of eastern Europe and western Asia, coming as far west as England and south to Italy and Africa; rarely found at sea, it frequents marshes, feeding in morning and evening on aquatic plants and seeds, insects, and the fry of fish; it is fond of breeding in the holes of marmots in river banks, and the eggs are 8 to 10. Other species are found in Aus-

tralia and New Zealand, and they all resemble geese in general form, and especially in the females having the plumage colored nearly like the males.—In America the name of sheldrake is given to the red-breasted merganser (*mergus serrator*, Linn.), which resembles the European sheldrake only in the color of its breast.

SHELL, in gunnery, a hollow shot for mortars and heavy guns, filled in part with powder, or with this and other substances, as pieces of iron, leaden balls, &c., which are thrown out with violence on the bursting of the missile. Common shells are termed bombs, and are described under that head. Beside these, a variety of others have been introduced in modern warfare. The Shrapnell shell, invented by Major Shrapnell of the British army, is a hollow sphere of iron, cast just strong enough to withstand the force of the explosion by which it is driven from the mortar or gun. It is divided into two compartments, one for holding a number of balls larger than musket balls and the other for the powder, which by its explosion is to burst the shell. It is furnished with a fuse differently contrived in different countries, but always with the design of firing the charge at a definite interval of time, or after the shell has passed a definite distance. Commonly a number of fuses are made in the shell, each one marked for the time it will burn, and either may be selected and exposed to ignition when the piece is discharged, the remainder being protected. The Belgians use a coiled fuse protected by a metal cover, and cut off enough of it to cause the explosion at the desired instant. The design of this projectile is to carry the musket balls to a greater distance than they would reach effectively if projected separately, and, just before reaching the object aimed at, as a body of troops, to set them free from the case that contains them. They then continue on, the bursting of the shell causing them to scatter to a moderate extent only. The concussion of the balls against the case when the piece is fired was found to be so great as sometimes to ignite the powder if placed in the same chamber with the balls; hence the shell is divided into two chambers separated by a diaphragm. Leaden balls are sometimes squeezed together either by the first concussion, or owing to the different specific gravities of the lead and of the iron case; and it has consequently been found necessary to harden them by antimony and zinc added to the lead. The desired density is thus retained, inducing a longer flight than if the shells were charged with iron balls. The English fill the spaces between the balls with melted sulphur; but in the U. S. service a mixture of charcoal dust and meal powder is employed.—Martin's shell is a good substitute for red-hot shot. It is a common shell with an iron screw stopper. Molten iron is poured in, the hole is screwed up, and the projectile is immediately introduced into the gun and discharged.—Shells for rifled guns are of cylindrical form and

pointed at the end. Having a polar movement so that the conical end always strikes first, they are adapted for percussion priming, which placed in this end explodes as the projectile reaches the object against which it is thrown. (See RIFLE.)

SHELL LAC. See LAC.

SHELLEY, PERCY BYSSHE, an English poet, born at Field Place, near Horsham, Sussex, Aug. 4, 1792, drowned in the bay of Spezzia, July 8, 1822. His ancestors had long been large landholders in Sussex. His father, Sir Timothy Shelley, the second baronet, was, according to Capt. Medwin, an ordinary country gentleman, who had studied at Oxford and made the grand tour to little advantage, and whose ethical notions admitted of laxity, but enjoined propriety of conduct. Remarkable for a peculiar personal beauty, Bysshe was sent in his 6th year to a day school near home, and in his 10th to a seminary at Brentford, and excelled in his studies, though devoting little time to them. He delighted in vague schemes and meditations, moonlight walks, stories of banditti, haunted castles, and *diablerie*, and in strange amusements. At the age of 13 he went to Eton, where he refused to fag, and was consequently harshly treated by his schoolfellows, till he alarmed them by his storms of anger or won their love by his kindness. In the dedication of the "Revolt of Islam" he refers to his sense of loneliness at school, amid "the harsh and grating strife of tyrants and foes." He was already in love with Miss Grove, a cousin of his own age, with whom he wrote a romance entitled "Zastrozzi," with the payment for which he gave a magnificent banquet to his friends. He wrote another romance, "St. Irvyne, or the Rosicrucian," translated a portion of Pliny's "Natural History," and composed in conjunction with Capt. Medwin the poem of "Ahasuerus, or the Wandering Jew," a portion of which was afterward published; but his greatest passion was for chemistry, and he continued eagerly to experiment with electricity and acids after his return home in 1809. In 1810 he went to Oxford, and became an undergraduate of University college. At first devoted to physics, he abandoned them for metaphysics after having blown himself up, swallowed a quantity of arsenic by mistake, and covered his clothes, books, and furniture with stains. Hume and the French exponents of Locke were his text books, and notwithstanding the spiritual and romantic character of his genius he soon rushed to materialism and atheism. At the age of 17, says De Quincey, satisfied that atheism was the sheet anchor of the world, he determined to accomplish a general apostasy successively in the university, the church of England, and the whole Christian world. He began with printing a pamphlet of 2 pages on the "Necessity of Atheism," setting forth the defective logic of the usual arguments for the divine existence. The authorities having decided to take no notice of it, Shelley sent the



pamphlet with a letter to each of the 25 heads of colleges, inviting them to notify him of their assent to the accompanying argument. "It was a fine spring morning," says his fellow student Hogg, "on Lady day in 1811, when I went to Shelley's rooms. He was absent, but before I had collected our books he rushed in. He was terribly agitated. I anxiously inquired what had happened. 'I am expelled.' He then explained that he had been summoned before the master and some of the fellows; that as he was unable to deny the authorship of the essay, he had been expelled, and ordered to quit the college the next morning at latest." His father would have received him if he had made some slight concession and conformed to the usages observed in orthodox households; but, in consequence of his refusal, he forbade his son's appearance at Field Place. When less than 19, says Mrs. Shelley, "fragile in health and frame; of the purest habits in morals; full of devoted generosity and universal kindness; glowing with ardor to attain wisdom; resolved, at every personal sacrifice, to do right; burning with a desire for affection and sympathy; he was treated as a reprobate, cast forth as a criminal." All communication was forbidden between him and Miss Grove, who soon married another. He took lodgings in Poland street, London, in a state of pecuniary embarrassment. His sisters, who were at school at Brompton, sent him small sums saved from their pocket money, the bearer being their schoolmate Harriet Westbrook, whose family resided in London. With her, a beautiful daughter of a retired hotel-keeper, he became intimate during her holidays, and after making an arrangement with his father, who settled upon him an allowance of £200 a year, he suddenly eloped with her and married her at Gretna Green. He was aged 19, and she 16. In letters of doubtful authenticity, he refers to her as a girl "who had thrown herself on his protection," and "with whom he was not in love." The young pair went to Edinburgh, thence to York, and thence to the region of the lakes, fixing their residence at Keswick. There Shelley became intimate with Southey, who took particular interest in him notwithstanding the opposition of their creeds, and with De Quincey, who records that he heard him described as "looking like an elegant and slender flower, whose head drooped from being surcharged with rain;" and he received many favors from the duke of Norfolk. He had already obtained the friendship of Leigh Hunt, and proposed to him a scheme for forming an association of liberals; and at Keswick he began a correspondence with Godwin, whose advice probably saved him from extreme imprudence in the championship of Irish wrongs, when soon after he removed to Dublin. The police, however, suggested to him the propriety of quitting Ireland, and he resided successively in the Isle of Man, in North Wales, and in Lynmouth. From the last named place he

addressed an eloquent letter to Lord Ellenborough, for passing sentence on the publisher of the 3d part of Paine's "Age of Reason." "During my existence," he wrote in 1812, "I have incessantly speculated, thought, read." In the solitude of Lynmouth he projected many works, and wrote several letters to his friends on social and literary questions. "Apparently he had within him the instinct of his own wandering Jew for eternal restlessness," for soon afterward he took a cottage in Tanyralt, Caernarvonshire; and prior to May, 1813, he had visited London, resided again in Dublin, made a tour to the lakes of Killarney, and returned to London. In Tanyralt, as in all other places, his benevolence was constantly manifested in visiting and relieving the poor and suffering. This, however, did not prevent an atrocious and mysterious attempt on his life, which was never explained, and which occasioned his immediate removal. In London was born his first child, a daughter, christened Ianthe Eliza. He soon after removed to the cottage of High Elms, in Berkshire, where he passed the summer, with the exception of visits to London and Field Place. Toward the close of 1813 the estrangement which had been slowly growing between him and his wife resulted in their separation, and she returned to her father's house, where she gave birth to a second child, which died in 1826. No satisfactory account of the circumstances of this event has ever been given. A discordant influence was attributed to an elder sister of Mrs. Shelley. Lady Shelley in her "Memorials" (1859) remarks: "We, who bear his name, and are of his family, have in our possession papers written by his own hand, which in after years may make the story of his life complete, and which few now living, except Shelley's own children, have ever perused." He was soon after travelling abroad with Mary, afterward the second Mrs. Shelley, daughter of William Godwin and Mary Wollstonecraft, all of whom deemed marriage a useless institution. They visited Switzerland in 1814, where his greatest delight was in sailing down the rapids of the Rhine on a raft. His father, succeeding to the family estates, settled on him from this time an allowance of £1,000 a year. In the winter he frequented a hospital to acquire some knowledge of surgery, that he might become more serviceable to the poor; made several trips in England in 1815; and again visited Switzerland in 1816, where he first met Byron. On his return he learned that his wife had drowned herself, and his sorrows are said to have made him for a time actually mad, and as such he describes himself in "Julian and Maddalo." He now married his second wife, who had been his companion for two years, and fixed his residence in the neighborhood of Marlow in Buckinghamshire, endearing himself to the villagers by his kindness, and engaged in composing his poems. He claimed the custody of his children, which was refused by the court of chancery on the

ground of the alleged depravity of his religious and moral opinions. He responded to the decision by a terrible curse on the lord chancellor. He became acquainted with Keats, and James and Horace Smith, at the house of Leigh Hunt, defended the genius of the first against the reviewers, and afterward wrote to his memory the dirge of "Adonais." While at Oxford he had published in conjunction with Hogg a small volume of burlesque poems. Though doubting whether to devote himself to poetry or metaphysics, he had written at the age of 18 a poem in the rhythm of Southey's "Thalaba" entitled "Queen Mab," which he did not publish, but distributed copies among his friends. An edition was surreptitiously issued in 1821, when he was in Italy. He applied to chancery for an injunction to restrain the sale, which was refused on the ground that the law could give no protection to a heretical book, nor even recognize it except by prosecution. He himself admitted the crudity both of its literary composition and its moral and political speculations; and though abounding in proofs of genius, it deserves no mention as a record of opinions. In 1815 he wrote at Bishopsgate, on the Thames, his poem of "Alastor, or the Spirit of Solitude," designed to represent a youth of pure feelings and adventurous genius, led forth, with an imagination inflamed by familiarity with all that is excellent and majestic, to the contemplation of the universe, and sinking to an untimely grave as he fails to discover a prototype of his conception. It contains passages which he scarcely surpassed in picturesqueness of language and compass of imagination. At Marlow he wrote the "Revolt of Islam," in the Spenserian stanza, designed to record the efforts, failures, triumphs, and death of a young man and maiden as champions of liberty, and containing passages referring to the late chancery decree which separated his children from him. He was there indefatigable in visiting the cottages of the poor, and consequently suffered a severe attack of ophthalmia. In the following year (1818), burdened by a hopeless desire to redress the wrongs of society, and fearing lest his son by his second wife should be taken from him, he left England, never to return. At Lucca he completed the poem of "Julian and Maddalo," a dialogue between himself and Lord Byron, and began his "Prometheus Unbound," which was finished in Rome in 1819. He had already begun the study of Plato, whose theory that all phenomena are imperfect resemblances of archetypal realities he accepted; and this poem has an airy grandeur, a mystic and shadowy imagery, which renders it remote from real life. The hero was intended to be a "type of the highest perfection of moral and intellectual nature, impelled by the purest and the truest motives to the best and noblest ends." Though revealing his mastery of the simple spirit of the Greek drama, the characters are ethereal, and the soliloquies, descriptions, and lyrical

effervescences are abstract and almost without human interest. His next production was "The Cenci," a tragedy repulsive in its subject, but the most elaborate in execution of all his writings. "Beside grandeur and terror," says Leigh Hunt, "there are things in it lovely as heart can worship. The utmost might of gentleness, and of the sweet habitudes of domestic affection, was never more balmily impressed through the tears of the reader, than in the unique and divine close of that dreadful tragedy. Its loveliness, being that of the highest reason, is superior to the madness of all the crime that has preceded it, and leaves nature in a state of reconciliation with her ordinary course." His own experience may have suggested the contrast between the tyranny and brutality of the old Cenci and the ideal loveliness of Beatrice. In 1819 he wrote the "Witch of Atlas" in 8 days after a pedestrian excursion, and in 1821 produced his "Epipsychidion," "Adonais," and "Hellas." Among his minor poems, the most exquisite and original are the "Address to the Skylark," "The Sensitive Plant," and "The Cloud," which approach nearly to the character of "pure poetry." He had renewed his intimacy with Byron in Italy, and enjoyed boating as his favorite amusement. On July 8, 1822, he sailed with his friend Williams, in a boat of peculiar build, and requiring skilful management, from Leghorn for Lerici. In a sudden squall the boat disappeared, and the body of Shelley was washed ashore with a volume of Keats's poetry open in one of his coat pockets. The quarantine regulations of Tuscany required that every thing drifting from the sea should be burned, and the remains of the poet were therefore reduced to ashes on a funeral pile, after the ancient fashion, in the presence of Lord Byron, Leigh Hunt, and Mr. Trelawney. The ashes were saved and deposited in the Protestant burial ground at Rome, near the grave of Keats, with the inscription: *Cor Cordium*; and he has since been often styled the "poet of poets."—Shelley was an eminent instance both of an impulsive character and an abstract intellect. His theory of love was hardly less than an apotheosis of impulse, though his conduct was higher than his creed, and has escaped the reproach of sensuality. To reform mankind and to penetrate the mystery of existence were the goals of his speculation; but while refining theories he neglected the grasp of realities. It has been said that he describes not our world, but the Platonic idea of a world. He sometimes regards nature, like Lucretius, as composed of half-personified atoms, moving hither and thither of themselves; sometimes he passed to the negative theory of immaterialism, and believed only in "sensations and impressions" inherent in nothing; and in the highest form of creed which he ever clearly expressed he conceived of the Deity as an idea rather than a character, as an object of intense admiration, but not of worship. Macaulay says that the words "hard"

and "inspiration," generally so meaningless when applied to modern poets, have a special significance when applied to Shelley. His nerves quivered and his frame shook in the contemplation of an idea. He himself defines poetry as "the record of the best and happiest moments of the happiest and best minds," as a sort of "interpenetration of a diviner nature through our own." In connection with the intensity of his passion and the gorgeousness of his imagination, the usual precision of his language is remarkable. The subtlety of his intellect appears in his highest meanings and wildest ecstasies, though the remoteness of his subjects makes many of his pages of little interest. His reputation both as a poet and a man has risen as the misapprehensions of his contemporaries have passed away, and his sincerity, benevolence, noble aims, and peculiar graces of character and genius have been fully recognized.—Mrs. Shelley published an edition of his poetical works, with biographical notes, in 1839, and a selection from his letters, translations, and prose writings, in 1840. See also the "Life" by Capt. Thomas Medwin (London, 1849); "Recollections of the Last Days of Shelley and Byron," by E. J. Trelawney (London and Boston, 1858); "Life of Shelley," by Thomas Jefferson Hogg (London, 2 vols., 1858); and the "Shelley Memorials," by Lady Shelley (London and Boston, 1859).—MARY WOLLSTONECRAFT GODWIN, second wife of the preceding, an English authoress, born in London in 1798, died there, Feb. 1, 1851. The daughter of William Godwin and Mary Wollstonecraft, she received a careful and peculiar education, and was married to Shelley in 1816, after having lived with him some two years previous to his first wife's death. In 1816, on the lake of Geneva, she joined in a compact with Shelley and Byron each to write a romance in imitation of the German ghost stories which they were reading. The result was her remarkable novel of "Frankenstein," the hero of which, by a profound study of occult science, discovers the secret of generation and life, and proceeds to the creation of a man by the resources of natural philosophy. He thus produces a powerful and mischievous monster, and a series of wild and horrid events succeed, amid which the authoress skilfully sustains a strong human interest and sympathy. She completed the novel of "Valperga" just before the death of Shelley, and afterward published "The Last Man," "Lodore," and "The Fortunes of Perkin Warbeck," each in 3 volumes. She also wrote "Rambles in Germany and Italy," a pleasing account of her journeys with her husband, and a series of biographies of foreign artists and poets, for the "Cabinet Cyclopædia;" and she edited Shelley's "Poetical Works" (1839), with prefaces and biographical notes, and a collection of his "Essays, Letters from Abroad, Translations, and Fragments" (1840).

**SHELLS**, the coverings of mollusks. See **CONCHOLGY**.

**SHELTON**, **FREDERIC WILLIAM**, an American author, born at Jamaica, Long island, N. Y., about 1814. He was graduated at the college of New Jersey in 1834, took orders in the Protestant Episcopal church in 1847, and has been successively settled at Huntington, Long island, at Fishkill on the Hudson, and at Montpelier, Vt., whither he went in 1854. He has published "The Trollopia, or Travelling Gentleman in America" (New York, 1837), a satirical poem aimed at the flippant English works of travel in the United States formerly so numerous; "Salander and the Dragon, a Romance" (1851), and "Ohrystalline, or the Heiress of Fall-Down Castle" (1854), designed to exhibit the evil effects of slander and suspicion; "The Rector of St. Bardolph's, or Superannuated" (1853); "Up the River" (1853), a series of rural sketches, originally contributed, like many of his other writings, to the "Knickerbocker Magazine;" and "Peeps from the Belfry, or the Parish Sketch Book" (1855).

**SHEM** (Heb., name, or fame), one of the three sons of Noah, according to most commentators the eldest. He was the progenitor of the south-western nations of Asia, being the father of Elam (Persia), Ashur (Assyria), Arphaxad (according to Josephus, Chaldeas), from whom descended the Hebrews and Arabs, Lud (Lydia), and Aram (Syria). The region occupied by the biblical Shemites or Semites thus extended from the mountains E. of the Tigris to the western offshoots of the Taurus, and from the Armenian mountains to the southern extremities of the Arabian peninsula. (See **SEMITIC RACE AND LANGUAGES**.)

**SHENANDOAH**, a river of Virginia, the principal tributary of the Potomac. The main river, or South fork, rises in Augusta and Rockingham cos. in 3 streams which unite near Port Republic, Rockingham co., flows N. E. through the valley of Virginia, W. of and nearly parallel with the Blue ridge, receives the North fork at Front Royal, Warren co., about 40 m. from its mouth, and falls into the Potomac at Harper's Ferry. Its length from Port Republic is about 170 m., and it is navigated by small boats, called gondolas, for more than 100 m. above Front Royal. It passes through the richest portion of Virginia, and affords immense water power for manufacturing purposes.

**SHENANDOAH**, a N. E. co. of Va., intersected by the North fork of the Shenandoah river; area, about 500 sq. m.; pop. in 1860, 18,896, of whom 753 were slaves. The surface is hilly and the soil generally fertile. In 1850 there were 19 grist mills, 3 saw mills, 10 churches, 2 newspapers, and 130 pupils in public schools. Iron ore, lead, copper, coal, and limestone are found. The value of real estate in 1856 was \$4,477,839, an increase of 23 per cent. since 1850. The Manassas Gap railroad traverses the county. Capital, Woodstock.

**SHENSTONE**, **WILLIAM**, an English poet, born at the Leasowes in Hales-Owen, Shropshire, in Nov. 1714, died there, Feb. 11, 1763.

He was educated at Pembroke college, Oxford, where he remained for a number of years, though he never took a degree. About 1745 he retired to his hereditary estate of the Leasowes, which it thenceforth became the business of his life to beautify by his skill in landscape gardening, and which it was his delight to show to strangers. He so improved its value that it sold at auction in 1795 for £17,000, though the original rental was only £300 per annum. He wrote elegies, odes, ballads, and miscellaneous pieces, but is best known by the "Schoolmistress," a poem published in 1742, and suggested by his childish reminiscences of the old dame who taught him to read. Gray pronounced it "excellent of its kind and masterly." Dodsley published his works in 3 vols. 8vo. An edition of his poems, with a memoir, appeared in Edinburgh in 1854. He was a man of great tenderness of heart, and, though involved in pecuniary difficulties, gave largely to the poor.

SHEPARD, CHARLES UPHAM, M.D., LL.D., an American physicist, born at Little Compton, R. I., June 29, 1804. He was graduated at Amherst college in 1824, spent nearly a year at Cambridge under the instruction of Thomas Nuttall, and, after giving private lessons in botany and mineralogy for some months in Boston, entered the laboratory of Prof. Silliman at Yale college, as an assistant. After holding this position for about two years, he took charge for one year of an institution opened at New Haven by James Brewster, Esq., for furnishing to the citizens of that city popular lectures on science. In the winter of 1832-'3 Mr. Shepard, under a commission from the U. S. government, made an investigation into the plans adopted in the culture of the sugar cane and the manufacture of sugar in the southern states, and incorporated the results of his observations in Prof. Silliman's report to the secretary of the treasury in 1833. He had previously been appointed lecturer on natural history in Yale college, a post which he held till 1847. In 1834 he was appointed to the professorship of chemistry in the Charleston medical college, S. C., and has discharged its duties until the present year (1861). In 1835 he was appointed associate of Dr. Percival in the state geological survey of Connecticut. In 1845, on the election of Dr. Hitchcock to the presidency of Amherst college, he was chosen professor of chemistry and natural history in that institution, which position he still retains. He devoted much time to the application of chemistry, geology, and mineralogy to mining and agriculture; but his chief labors have been expended upon the subject of mineralogy, and the investigation of meteorites. His collection of minerals and meteorites, now deposited in Amherst college, is the finest in the United States, and surpassed in Europe only by those of the British museum and the imperial cabinet of Vienna. In the prosecution of his favorite studies, Prof. Shepard has traversed nearly

every part of North America, and visited Europe 7 times. Beside numerous papers contributed to scientific periodicals, and several addresses, pamphlets, &c., he published in 1832 the first edition of his "Treatise on Mineralogy," of which a 3d edition, greatly enlarged, appeared in 1855; and in 1837 a report on the geology of Connecticut.

SHEPARD, SAMUEL, M.D., an American clergyman, born at Salisbury, Mass., June 22, 1789, died at Brentwood, N. H., Nov. 4, 1815. He studied medicine, and practised for some time in Brentwood, N. H., but in 1771 was ordained to the ministry, and settled over 3 Baptist churches, Brentwood, Stratham, and Nottingham. For more than 40 years he continued actively engaged in the ministry, travelling over considerable portions of the state, and organizing branch churches to the Brentwood church. He published 5 or 6 works, all of a controversial character, and intended to refute the doctrines of Pædobaptists respecting baptism, the views of the Friends in regard to spiritual baptism, and the tenets of the Universalists and Annihilationists.

SHEPARD, THOMAS, an American clergyman, born near Northampton, Eng., Nov. 5, 1605, died at Cambridge, Mass., Aug. 25, 1649. He was educated at the university of Cambridge, soon after leaving which he became eminent as a Puritan preacher. Becoming obnoxious to the government on account of his religious sentiments, he made his escape to New England in 1635, and took charge of the church at Cambridge in Feb. 1636, where he remained till his death. He was active in founding Harvard college, and was one of its most efficient patrons. He published 17 or 18 works, mostly on theological topics.

SHERBET, a favorite beverage in Persia and other eastern countries, whence it was introduced into Europe. It is simply lemonade with the addition of amber, rose water, perfumed cakes, the pulp of fruits, or other ingredients. It is also sometimes made of violets, honey, and juice of raisins.

SHERBURNE, a central co. of Minnesota, bounded S. W. by the Mississippi, and intersected by Snake river; area, 445 sq. m.; pop. in 1860, 724. Elk lake is in the N. W. part of the county. Capital, Humboldt.

SHERIDAN. I. THOMAS, an Irish clergyman and scholar, born in the county of Oavan about 1684, died in Dublin, Sept. 10, 1738. He was educated by private charity at Trinity college, Dublin, took orders, received the degree of D.D., and was named chaplain to the lord lieutenant. Losing his college fellowship by marriage, he opened a school in Dublin, which proved highly successful, but finally ruined it by negligence and extravagance. In 1725 he was presented to a living through the influence of Dean Swift, but lost his chaplaincy and all hope of further preferment by preaching a sermon on the birthday of George I. from the text: "Sufficient unto the day is the evil thereof."

After several other changes of fortune he died in great poverty and distress, having maintained through all a gay and careless cheerfulness, not allowing a day to pass, according to Lord Cork, "without a rebus, an anagram, or a madrigal." He published a translation of Persius in prose, and one of Sophocles' "Philoctetes" in verse, now little valued; and many of his letters are included in Swift's "Miscellanies."

II. THOMAS, an actor, elocutionist, and lexicographer, son of the preceding, born at Quilca, the residence of Dean Swift (who was his godfather), near Dublin, in 1721, died at Margate, Aug. 14, 1788. He was educated at Westminster school and at Trinity college, Dublin, and went upon the stage as the best school of oratory, of the value of which he possessed an extravagant notion. In 1744 he played at Drury Lane theatre, and, being set up by some of his friends as a rival to Garrick, had a quarrel with him which was never healed. For 8 years he managed the Dublin theatre, but finally, disregarding a popular clamor for the production of a certain play, a fierce riot broke out, and he retired. He then engaged in lecturing on elocution, and excited much attention in London, Oxford, Cambridge (where he received the degree of M.A.), and Scotland, where through his influence Drs. Blair, Ferguson, Robertson, and others united in forming a "society for promoting the reading and speaking of the English language in Scotland." He received a pension from the crown on the accession of George III., and continued his efforts on behalf of elocution with some interruptions till his death; they however gradually lost their popularity, and were held in great contempt by Dr. Johnson. In 1760 he appeared again briefly at Drury Lane, when his quarrel with Garrick was renewed; and his last performance was at Covent Garden in 1776. After Garrick's retirement in that year, Sheridan was for 3 years manager of Drury Lane, his son Richard Brinsley being lessee. He then retired altogether from the theatre, and in 1780 published his "Complete Dictionary of the English Language, both with regard to Sound and Meaning, one main Object of which is to establish a plain and permanent Standard of Pronunciation." Among his other works are: "Lectures on the Art of Reading," "Course of Lectures on Elocution," and a "Life of Swift."

III. FRANCES, wife of the preceding, a novelist, born in Ireland in 1724, of English parentage, died in Blois in Sept. 1766. She became acquainted with Sheridan by means of a pamphlet which she published in his defence during his managerial troubles in Dublin, and they were soon after married. She was greatly esteemed as an amiable and accomplished woman, and her romances, "Sidney Biddulph" and "Nourjahad," are still admired. She was also the author of two less successful comedies, "The Discovery" and "The Dupe." IV. RICHARD BRINSLEY, an English dramatist and politician, son of the preceding, born in Dublin

in Sept. 1751, died in London, July 7, 1816. He was placed in a school in Dublin when 7 years old, and by both his parents and preceptor was regarded as "a most impenetrable dunce." In 1762 he was sent to Harrow, where he remained till his 18th year without showing any evidences of industry, and only occasionally of ability. Thence he went to Bath, where his family had settled, and in conjunction with a friend named Halhed wrote some fugitive pieces, and a translation of Aristænetus, which was published, but proved unsuccessful. His literary labors were however disturbed by his passion for Miss Linley, a young and beautiful singer of Bath. To save her from the persecutions of a libertine named Matthews, he fled with her early in 1772 to France, and in March they were secretly married at Calais. The result was two duels with Matthews, growing out of the studied insults of the latter, in the last of which Sheridan was wounded. In 1773 he entered the Middle Temple as a student of law, and shortly afterward was married anew by license. He then retired to a cottage at East Burnham, refusing to allow his wife to keep or make any engagement to appear in public, although their pecuniary situation was by no means prosperous. On Jan. 17, 1775, his brilliant comedy of "The Rivals" was brought out at Covent Garden, and, though it failed the first night, speedily became the universal favorite it has ever since remained. It was followed the same year by the farce of "St. Patrick's Day, or the Scheming Lieutenant," and the comic opera of "The Duenna," which had the then unparalleled run of 75 representations during the season. In 1776 he became, with his father-in-law Mr. Linley and Dr. Ford, the purchaser of Garrick's moiety of Drury Lane, but by what means has never been known. In the following year he brought out "The School for Scandal," which unrivalled comedy placed him at once at the head of comic dramatists. This was followed in 1779 by a monody on the death of Garrick, and the farce of "The Critic," the last original work he wrote for the stage. From the beginning of his career politics had divided with literature the sway over Sheridan's mind, and about 1778 he wrote an unpublished political pamphlet on the state of Ireland, entitled an "Essay on Absentees." Embracing the principles of the whig party, his first service was in connection with a periodical paper called "The Englishman." In the brilliant society of Devonshire house, at which he was ever a welcome guest, his talents soon gave him a prominent position. In 1780 he was elected a member of parliament from Stafford, and immediately entered the ranks of the opposition to the administration of Lord North. His first speech was in reply to accusations brought against him for bribery and corruption in securing his election. Both his friends and his enemies were disappointed. He was told by a friend, whose opinion of his first attempt he asked, that oratory was not in his line, and

that he might better have stuck to his former pursuit. He rarely spoke after this, and only after great preparation. In 1782 Lord North went out of office, and in the short-lived ministry of Rockingham which followed, Sheridan became one of the under secretaries of state. After the accession of Shelburne to the treasury, he, along with most of the friends of Fox, resigned. In the coalition ministry of Fox and North in 1783, Sheridan held the office of secretary of the treasury, but retired on the accession of William Pitt soon afterward. Parliament having been dissolved, he was one of the few adherents of the coalition that were reelected in 1784. On Feb. 7, 1787, Sheridan brought forward the charge against Warren Hastings touching the spoliation of the begums or princesses of Oude in an oration which was the greatest effort of his life. He sat down amid the most tremendous cheering, and the excitement produced was so great that the debate was instantly adjourned. Burke declared it "the most astonishing effort of eloquence, argument, and wit united, of which there was any record or tradition." No report of any value exists of this speech. In the subsequent trial of Hastings in Westminster hall, where Sheridan was one of the managers of the impeachment, he followed up his previous address by a second oration little inferior, which lasted 4 days. The indisposition of the king, which commenced about this time, gave hopes to the whigs of an accession to power, and in the public proceedings connected with that event he acted as confidential adviser to the prince of Wales. The remarks made by him, but especially by Burke, in regard to the calamitous situation of George III. rendered their party still more unpopular. In 1790 he was reelected to parliament from Stafford; but, though his abilities were as shining as ever, he now began to reap the consequences of faults and misfortunes which were to darken his whole future life. A rupture took place between him and Burke, caused somewhat by a mutual jealousy, but ostensibly by a difference of opinion on the French revolution. In June, 1792, his wife died, and in 1795 he married a Miss Ogle, daughter of the dean of Winchester. Pecuniary embarrassments were beginning to thicken around him, caused by his careless and extravagant style of living. The irregularities of his private life also placed him under the ban of public opinion. He still acted a conspicuous part in the house of commons, vehemently assailing the administration, but at the time of the mutiny at the Nore lending it his support. In 1799 he brought out the play of Pizarro, which is in great part a translation from the drama of Kotzebue. Sheridan supported the short-lived ministry of Addington, and in this differed from Fox, between whom and himself a feeling of reserve and even alienation had been for some time growing. In the ministry of Grenville and Fox, which succeeded the death of Pitt, he accepted the comparatively unim-

portant office of treasurer of the navy. He was elected from Westminster after a severe contest; but in 1809, while speaking in the house of commons, he saw himself involved in almost total ruin by the burning of Drury Lane theatre, in rebuilding which he had already loaded himself with debt. In 1812 he failed to be reelected from Stafford, and this filled up the measure of his ruin. His health had been destroyed by drink, and his spirits were depressed by a succession of harassing duns. His books, his furniture, his presents were sold or passed into the hands of pawnbrokers; even the portrait of his first wife by Reynolds went out of his possession; and he was at one time imprisoned 2 or 3 days for debt. His last moments were embittered by the importunity of creditors, who scarcely heeded the sacredness of the dying hour. On May 15, 1816, he wrote to the poet Rogers that he was absolutely undone and broken-hearted, and added: "They are going to put the carpets out of window, and break into Mrs. S.'s room and take me." A few days afterward an officer arrested the dying man in his bed, and would have carried him to the sponging house had he not been threatened with prosecution by Sheridan's physician. He died near his sick wife, deserted by all except his medical adviser and Peter Moore, Rogers, and Lord Holland, the few friends who had remained faithful to him in his misfortunes. He was buried in the poets' corner in Westminster abbey, and the funeral, which was exceedingly magnificent, was graced by a brilliant array of royal and noble mourners, who had left him to die in penury.—While affecting the utmost carelessness and indifference in the production both of his writings and speeches, Sheridan really made the most laborious preparation; and in his addresses the more striking passages, and even the jests, were often rewritten several times. His bon-mots in society were also often prepared beforehand; but he patiently waited for the proper occasion to deliver them. His life, written by Thomas Moore, was published in 1825; his "Speeches" were "edited by a Constitutional Friend" (5 vols. 8vo., London, 1816); and his "Dramatic Works" form a volume of Bohn's "Standard Library" (London, 1848).

SHERIFF (*Sax. scyre*, shire, and *gorefa* or *refa*, keeper or steward), in Great Britain and the United States, the chief officer of a county. The office of sheriff is of ancient Saxon origin, as appears from the composition of the word, which successively assumed the forms of shyregreve, shiregreve, shirereeve, and shireve. Cowell writes the word shireve, and Blount shirif or shiref. In the Norman period the earl or count (*comes*) was the one to whom was committed the custody of the shire or county; and when in course of time he was relieved of the active functions of the office, they were devolved upon an inferior officer, called therefore *vices-comes*, who is identical with the sheriff. Gradually the earls were discharged not only of the duties of the office

but also of the commission, and the sheriffs thus came to be the immediate officers of the crown and not of the earls; and the sheriff succeeded to almost all the authority, judicial and ministerial, that the *comes* or earl had hitherto possessed. Until the time of Edward II. the sheriff was elected by the inhabitants of the several counties; but a statute of the 9th year of that reign abolished election, and ever since, with few exceptions, the sheriff has been appointed, upon nomination by the king's councillors and the judges of certain ranks, by the approval of the crown. In some cities and towns, however, the sheriff is elected either by the whole body of the freeholders or by some particular body of the corporation. London claims prescriptive right to elect her two sheriffs. The office of sheriff is still in England one of eminent honor, and is conferred on the wealthiest and most notable commoners in the counties.—The English sheriff, the sheriff of the common law, we may say, is the custodian of the county and the conservator of the king's peace therein. In virtue of these functions he is bound to apprehend all disturbers of the peace and to bind them to good behavior or commit them for examination, and to arrest and commit all felons. To these ends he has the right to summon to his aid whenever it is necessary the *posse comitatus*, or power of the county, and he has the custody of the county gaol. In a ministerial capacity it is his office to execute all writs and processes directed to him by the superior courts of judicature, to take recognizances and bail, to summon juries, and to execute final process and judgments of the courts whether civil or criminal. As king's bailiff, he is to take into his charge all lands falling to the crown under attainders or by escheats, levy all fines and forfeitures, and collect all waifs and estrays. Finally, in his judicial capacity he may adjudicate in certain petty suits of a civil nature. Since Magna Charta he has been competent to entertain pleas of the crown, or criminal causes. He also determines matters touching the election of knights of the shire, of coroners, and other officers.—The sheriff retains in the United States many of the faculties of the sheriff at common law; yet his capacity in all respects is much dependent on the provisions of special statutes. His judicial powers are particularly restricted here; his duties are in fact almost entirely ministerial. Generally in the United States the sheriff is, like every other considerable officer, elected by the whole body of the people, and holds his office for a prescribed term of years. In New York he is ineligible for the 8 years next succeeding his term of office. As he cannot perform in his own person the manifold duties of his office, the sheriff may appoint deputies. In New York he is required, as soon as may be after assuming his official position, to appoint an under sheriff. This officer is the equal of the sheriff himself, and acts in his

stead in all respects when he is absent or his office is vacated by death or otherwise. The sheriff may create as many general deputies as he thinks proper. The deputy sheriff is in this country, though not in England, an officer known and recognized by the law. He is separately sworn, and has his distinct rights and liabilities. Primarily, however, the sheriff is responsible for all the deputy's defaults, his misfeasances and nonfeasances, in respect to duties imposed by the law upon the sheriff; as for example, if he take property not attachable, refuse to make an arrest, take insufficient bail, suffer an escape, or do illegal acts under color of his office.—As conservator of the peace it is the duty of the sheriff (and generally speaking the deputy may do what the sheriff may do) to suppress all unlawful assemblages, to quell all riots and affrays, and to arrest and commit to gaol, if need be, those engaged in the disturbance of the public order. For any breach of the peace or any crime or misdemeanor committed within his view the sheriff may make an arrest without a warrant. To suppress an affray actually going on, he may even break into a dwelling house, and so he may if he is in fresh pursuit of one who has committed an offence within his view, and there is danger that he may escape if he is not followed. When the breach of the peace has been committed at a time past, it is the sheriff's duty in most cases to provide himself with a warrant before making an arrest. In the service of this process, the sheriff appears, in a ministerial capacity, as the officer of the court which issues it. In making the arrest, the officer ought, properly speaking, to show his warrant, and make known, to a reasonable degree, the contents and purport of it. A recent statute in Massachusetts makes an especial provision in this behalf, and inflicts heavy penalties of fine or imprisonment upon any officer who shall refuse in such a case to give to his prisoner the reasons for making the arrest, or shall assign any untrue reason for the act. If the warrant were issued for the arrest of one who has committed a felony, the sheriff may even break the outer door of a house in order to execute the process. If the warrant of arrest appear upon its face to be defective in any essential respect, it is absolutely void, and all who participate in the execution of it are trespassers. The party arrested under a warrant ought to be brought presently before the court or magistrate who issued the process.—The sheriff's duties and powers in the execution of civil process differ in some respects from those imposed upon him in the execution of process in criminal matters. On the one hand, the officer is liable to the suitor at whose instance the process issues, if through negligence or error he fail to perform his whole duty in the service of it; while he is responsible to the party wronged if he exceed the power conferred upon him. Wherever then he has reasonable grounds to doubt his



authority to act in the premises, the sheriff may ask an indemnity. This is often done in cases where the title to property which is directed to be attached is doubtful, or when the officer questions the identity of a person whom he is ordered to arrest. Service of summons in a suit is made by reading it to the party to whom it is addressed, or ordinarily by delivering to him a copy of it, or by leaving the copy at his last usual place of residence. Attachment of property, as the first step in the suit, is common in the New England practice. It is unknown to the common law, and is founded upon statutes. To constitute a valid attachment of personal property, the officer must take actual possession of the goods. The subsequent use of the property by the owner with the officer's permission, when no harm is done to the goods by the using, or even a resumption of the possession by the owner for the purpose of making a delivery subject to the officer's attachment, does not vacate this attachment. A warehouse may be broken into in order to make an attachment of goods deposited there. Goods in a store are well attached by locking the door and taking the key. Shares of stock may be attached by leaving an attested copy of the writ and of the return of the attachment with the treasurer or other clerk of the corporation at the business office. The duty of the sheriff in respect to the drawing of jurors, the service of summonses or subpoenas, and other incidents of the trial of causes, is treated elsewhere. (See JURY, and SUBPOENA.)—When judgment is docketed in a civil suit against a defendant, it is the sheriff's business to levy the execution which thereupon issues at the instance of the plaintiff. Subject in some respects to the direction of the plaintiff or his attorney, it is the officer's duty to secure the amount of the execution, or the portion of it directed to be collected. If the defendant will not upon request satisfy by payment the amount of the judgment, the sheriff proceeds to satisfy it by the seizure of any goods of the defendant which can be found within the county. The levy may be made at any time before the return day of the execution, but it is expedient to make it at once lest there be any alienation of the property. Any property supposed to belong to the defendant and found in his possession, even though he asserts that it has been sold, mortgaged, or otherwise incumbered, ought to be levied upon by the officer; for if he neglects to do so he assumes the responsibility of showing that it was in fact exempt; and yet if he does levy and the defendant's statement was indeed true, he becomes liable as trespasser to the real owner or party holding a prior lien, and therefore he has a right to demand indemnity in any such case. In order to make a valid levy, the property ought to be present or in the view of the officer, and he should do some act to signify his claim to control it henceforth. Making a memorandum

upon the execution, making an inventory of the goods, or taking a receipt for them from some responsible party, may perhaps be a sufficient indication of a levy. The sheriff may not break into a house to make a levy, but he may enter if the door be open, and remain a reasonable time. No levy is necessary in the case of real property; the judgment itself is a sufficient lien. Property taken on execution, whether real or personal, is regularly exposed by the sheriff to sale by public auction; and the sheriff can sell such property only for cash.

SHERLOCK, WILLIAM, an English divine, born in Southwark about 1641, died in 1707. He was educated at Eton school, and at Peter house, Cambridge; became rector of the parish of St. George, Botolph lane, London, in 1669, prebend of St. Pancras in the cathedral of St. Paul's in 1681, master of the Temple in 1684, and dean of St. Paul's in 1691. Upon the revolution he refused the oaths of allegiance to William and Mary, and was suspended from his preferment, but at length submitted and took them. His case excited a great sensation at the time. He wrote many works, of which the principal are: "Case of the Allegiance due to the Sovereign Powers," "Vindication of the Doctrine of the Trinity," and "A Practical Discourse on Death."—THOMAS, an English prelate, son of the preceding, born in London in 1678, died in 1761. He was educated at Catharine hall, Cambridge, of which college he became master. In 1704 he was made master of the Temple, in 1714 vice-chancellor of the university, and in 1715 dean of Chichester. For his opposition to Dr. Hoadley in the Bangorian controversy he incurred the royal displeasure, and in 1717 was removed from the list of the king's chaplains. He was made bishop of Bangor in 1728, of Salisbury in 1734, and of London in 1748, having in the previous year declined the archbishopric of Canterbury on account of his health. His works consist principally of sermons, and were published in 5 vols. 8vo. in 1880. Of his "Pastoral Letter," published on the occasion of the earthquake in 1750, nearly 100,000 copies were printed.

SHERMAN, ROGER, an American statesman, and signer of the declaration of independence, born in Newton, Mass., April 19, 1721, died in New Haven, Conn., July 23, 1793. At an early age he was apprenticed to a shoemaker, which occupation he followed till after he was 22 years old, and, after his father's death in 1741, supported his mother and several younger children, while devoting all his leisure to study, especially of mathematics. In 1743 he removed to New Milford, Conn., and soon afterward joined an elder brother in keeping a small store. In 1745 he was appointed surveyor of lands for the county, and for several years after 1748 furnished the astronomical calculations for an almanac published in New York. Having studied law, he was admitted to the bar in 1754, was several times elected a member of the colonial assembly, and in 1759

was appointed judge of the court of common pleas. Having removed to New Haven in 1761, he became judge of common pleas there in 1765, and the next year an assistant or member of the upper house in the legislature (a body consisting of 12 persons), both which offices he held for 19 years, and his judgeship till 1789, the latter portion of the time on the bench of the superior court. In 1774 he was appointed a member of the first congress, a post in which he continued till his death, at which time he held a seat in the senate, having been elected thereto in 1791. He was also a member of the governor's council of safety, and from 1784 till his death mayor of New Haven; and he was for many years treasurer of Yale college. In the congress of 1776 he was one of the committee appointed to draft the declaration of independence; and during the war he served on many of the most important committees, and was successively a member of the board of war and ordnance and of the board of treasury. In 1783 he was associated with another judge in codifying the laws of Connecticut. He had been one of the committee which framed the old articles of confederation, but early perceived their defects; and he was one of the most efficient members of the constitutional convention of 1787, and was chiefly instrumental in securing the ratification of the constitution by the state convention of Connecticut. His services to the country were invaluable, and few of his contemporaries left their impress more clearly upon American institutions.

SHERRY, a Spanish wine made from grapes growing in the neighborhood of Xeres de la Frontera, Andalusia, near Oadiz. It is made from red and white grapes thrown indiscriminately into the vats, contains from 20 to 23 per cent. of alcohol, and after remaining in the wood 5 or 6 years becomes a rich, dry wine of considerable strength, although 25 or 30 years are required to perfect its flavor. Many varieties are made, and it is extensively imitated and adulterated. Comparatively little sherry wine is retained in Spain for home consumption, but great quantities are exported to Great Britain and the United States.

SHERWOOD, MARY MARTHA, an English authoress, born at Stanford, Worcestershire, July 6, 1775, died at Twickenham, near London, Sept. 30, 1851. Her father, the Rev. George Butt, was a clergyman of the established church, and educated her with great care. Her earliest work, "The Traditions," was published when she was 17 years old, against her wishes, and seriously to her injury, to aid a friend of her father's who had lost his property in procuring the means to set up a school. In her 20th year she published "Margarita," a fiction. "Susan Grey," "The Beautiful Estelle," and some smaller works by her appeared prior to 1800. In 1803 she married her cousin Henry Sherwood, a captain in the army, whom she accompanied in 1804

to India. Amid frequent changes of residence, the cares of an increasing family, and the loss of several children, Mrs. Sherwood instructed the orphan and half-orphan children of her husband's regiment, adopted several of them, and exerted a beneficial religious influence over the native women attached as nurses and servants to the regiment. She formed the acquaintance of the celebrated Henry Martyn, and was assisted by him in many of her missionary efforts. In 1818 Capt. Sherwood returned to England with his family, and in 1821 retired on half pay, settling at Wickwar, Gloucestershire, where they resided for the next 27 years. The loss of the greater part of their property occurred in 1843, and her husband died in 1849, leaving her dependent upon a sister, with whom she resided till her death. Mrs. Sherwood was a voluminous writer, her works amounting to 90 volumes, beside some volumes of tracts published conjointly by her and Mrs. Cameron. Some of them are interesting novels, and others works of great research and labor, like her "Chronology of Ancient History" and her "Dictionary of Scripture Types." Her best known works are: "Little Henry and his Bearer," "History of Henry Milner" (3 vols.), "Ermina" (3 vols.), "Roxobel, a Novel" (3 vols.), and "The Lady of the Manor" (7 vols.). Her memoir, mainly an autobiography, has been published by her daughter.

SHETLAND (or ZETLAND) ISLANDS, a group of about 100 islands in the Atlantic ocean, forming the northernmost part of the United Kingdom of Great Britain, extending from lat. 59° 51' to 61° 51' N., and from long. 0° 45' to 1° 45' W.; area of the whole, 5,558 sq. m.; pop. in 1851, 31,078. The largest island is Mainland, which alone contains about  $\frac{1}{4}$  of the area and  $\frac{3}{4}$  of the population of the whole group; and those next in importance are Foula, Papa-Stour, Mickel Roe, Whalsey, Yell, Bigga, Fetlar, Unst, E. and W. Barra, and the 8 Skerries. Lerwick, on the W. coast of Mainland, is the capital. The coasts are generally bold and precipitous; they vary in height from 500 to 1,200 feet above the level of the sea, and are indented with numerous deep landlocked bays and by long narrow arms of the sea called *coves*. The interior of the islands is not generally much elevated above the coasts, the highest summit in the group, in the N. part of Mainland, rising to the height of 1,476 feet above the sea. The surface is mostly rugged, or covered with moss, and the only tolerably fertile soil is in a few of the valleys and in the neighborhood of some of the bays. The geological formation consists of sandstone, gneiss, blue limestone, clay and mica slate, and granite. Copper has been discovered on one of the islands, and chromate of iron is exported from Unst. The climate is not remarkably cold, but there is much wet and tempestuous weather, and fogs are of frequent occurrence. In winter it is dark and dreary, but about midsummer

the sun scarcely disappears below the horizon. The soil is not favorable for agriculture, and very little of it is arable. In 1857 there were only 1,026 acres under cultivation; and the principal crops raised were black oats, bere, potatoes, and turnips. The live stock on the group are very diminutive; and small ponies, or shelties, are bred wild on the heaths and pastures and exported in great numbers. The inhabitants are extensively engaged in fishing, about 4,000 being employed in this branch of industry. Herring, cod, ling, and tusk are the principal kinds caught. The fishing season lasts about 3 months during summer. The only manufactures of any importance are hosiery, straw plaiting, and the preparation of kelp, but the two latter have fallen off greatly of late years. In 1851 there were 128 places of worship in the group, and 111 public and 36 private schools. The inhabitants are small, active, and hardy.—Shetland is supposed to be the "Thule" of Ptolemy, and the first people known to have inhabited the islands were of Scandinavian origin. They gave the group its name, and the present inhabitants are of their race. In 875 Harold Harfager reduced all the N. and W. islands to his authority. Sigurd became earl of Orkney, Caithness, and Shetland; but the authority of the earls was little felt in the last, as they had no jurisdiction in civil affairs, and were merely military protectors or leaders. When James III. of Scotland married the princess Margaret of Denmark in 1468, he received as a pledge for the payment of her dowry the Orkney and Shetland islands, and two years afterward he purchased both groups and annexed them to his dominions. The Shetland islands now form along with the Orkneys a county which returns one member to the British parliament.

SHEW, JOEL, M.D., an American physician, and one of the earliest hydropathic practitioners in the United States, born at Providence, Saratoga co., N. Y., Nov. 13, 1816, died at Oyster Bay, N. Y., Oct. 6, 1855. About the year 1841 he commenced the study of medicine, and soon after obtaining his degree visited the water-cure establishment of Priessnitz in Germany, adopted his views, and on his return commenced the practice of hydropathy. Beside superintending a large establishment, visiting numerous patients at remote distances, and contributing to the "Water-Cure Journal" (which he established) and other hydropathic periodicals, he published "Hydropathy, or Water-Cure" (New York, 1848); "Water-Cure Manual" (1850); "Management of Children in Health and Disease" (1852); "Midwifery and Diseases of Women" (1852); "Hydropathic Family Physician" (1854), and other works.

SHEW-BREAD (Heb. *lehem happanim*), the name of 12 unleavened loaves placed upon a table in the outer department of the Jewish sanctuary. Though the number 12 represented the 12 tribes, it was not diminished after the

secession of 10 of the tribes from the Mosaic worship, probably because the covenant with the whole people was regarded as eternally binding. The loaves were placed in two piles, one above another, and were changed every sabbath day by the priests. The removed bread became the property of the priests, who alone had a right to eat of it, and only in the holy place. In cases of emergency, however, they incurred no blame by giving it to persons who were in a state of ceremonial purity, as in the instance of David and his men (1 Sam. xxi. 4-6; Matt. xii. 4).

SHIAWASSEE, a S. E. co. of Michigan, intersected by a river of the same name; area, 576 sq. m.; pop. in 1860, 12,849. The surface is undulating and the soil fertile; timber is abundant, and bituminous coal is found. The productions in 1850 were 71,837 bushels of wheat, 57,065 of Indian corn, 83,137 of oats, 20,967 lbs. of wool, and 7,422 tons of hay. There were 5 grist mills, 3 founderies, 2 woolen factories, 2 churches, and 1,562 pupils attending public schools. Capital, Corunna.

SHIBBOLETH (Heb., a stream, and also an ear of corn), a word by the pronunciation of which the Gileadites under Jephthah, after their victory over the Ephraimites, tested the tribal affinity of the fugitives at the passes of the Jordan. Those who "could not frame to pronounce it right," but said "Sibboleth," were at once known for Ephraimites, although pretending not to be, and thus 42,000 of them were slain. (Judg. xii. 1-6.) It is hence used in English to signify any test or criterion of partisanship.

SHIELD (Ger. *Schild*), a piece of defensive armor, which before the invention of gunpowder was in almost universal use, but is now employed chiefly by barbarous or savage races. The shield of the ancients seems from the earliest times to have consisted of a framework of twisted osiers or light wood, over which one or more thicknesses of ox hide and sometimes ornamental or defensive metal work were fastened; and those described by Homer, of which the "sevenfold" shield of Ajax may be taken as an example, were sufficient to cover the body from the face to the knee. Shields were carried on the left arm, and were of various shapes and sizes. The *clipeus* was large and round, having a projection in the centre of the exterior, called the *umbo*, which sometimes terminated in a spike, but was intended to make the missiles glance off. The *scutum*, used by the Roman legionary soldiers, was adapted to the form of the human body by being made oval or oblong, and was 4 feet in height by 2½ in width. The *parma*, a smaller kind of round shield having a framework of iron covered by hides, was used by light troops; that known as the *pelta*, which was lighter still and of oval shape, was introduced among the Greeks by Iphicrates, and the troops armed with it were called *pellastæ*. Similar to this was the *cetra*, a small round target, borne by many ancient

rares, and probably identical with that formerly used by the Scottish highlanders. In time of peace the Greeks were in the habit of suspending their shields in the temples, having first taken the precaution to remove the handles, in order to render them unserviceable in case of any sudden popular outbreak. The Roman soldiers inscribed their names upon their shields, and men of family in many instances emblazoned them with devices illustrating the heroic feats of their ancestors, and sometimes with their own portraits, a practice to which may be ascribed the modern use of armorial bearings. Hence, to lose a shield in battle, or to return without it, as Horace did from Philippi, was considered a mark of cowardice. In the middle ages the knights and men-at-arms, being clothed in complete mail, had less need of the shield as a piece of defensive armor, and in actual service it fell into gradual disuse. The Norman shield until the middle of the 12th century was long and of the form called "kite or pear-shaped," but subsequently it became smaller, and as a vehicle for bearing heraldic devices assumed a variety of fantastic shapes, most of which have been preserved to the present day. (See ARMOR, and HERALDRY.)

SHIELDS, NORTH and SOUTH, two towns of England, situated respectively in the counties of Northumberland and Durham, on the N. and S. banks of the river Tyne, near the village of Tynemouth at its mouth in the North sea, 8 m. below Newcastle, and 176 m. N. N. W. from London; pop. of both in 1851, 37,856, of which number 8,982 belonged to North Shields. The manufactures of both North and South Shields consist principally of articles used for nautical purposes, and of glass, pottery, and alum. Ship building is extensively carried on, and there are large docks for repairing vessels. The entrance to the Tyne is difficult, but the risk is lessened by two lighthouses, one 123 and the other 77 feet above the level of the sea, which lead into the port. The number of sailing vessels registered at Shields on Jan. 1, 1858, was 967, of the aggregate of 262,659 tons, and 130 steamers measuring 2,986 tons. The name Shields is derived from the *sheels*, or sheds, in which the fishermen of the Tyne formerly lived. North Shields unites with Tynemouth in returning a member to parliament, and South Shields is a municipal and parliamentary borough in itself.

SHITES. See SHEEHANS.

SHIKARPOOR, a town of British India, in the province of Sind, situated about 15 m. W. from Sukkur on the Indus, on the route by the Bolan pass between Hindostan and Afghanistan; pop. about 80,000. It stands on a low plain which is inundated by the river at certain seasons, and is studded with orange groves, date plantations, and numerous orchards. There are some manufactures of cotton goods, said to rival those of Peshawar in quality. The Sind canal, leading from the Indus to Larkhana, passes within a mile of Shikarpoor. About  $\frac{1}{2}$

of the population are Hindoos, and the remainder Mohammedans.

SHILLING, an English coin of the value of 12*d.* sterling or  $\frac{1}{20}$  of a pound, equivalent to 24½ cents. (See PENNY, and POUND.) When a decimal currency based on the dollar was substituted in the United States for the old currency of £ *s. d.*, the two smaller of these denominations were very generally retained in name, even when there ceased to be coins in circulation of the values assigned to them. In New England currency, which has prevailed also in Virginia, Kentucky, Tennessee, Indiana, Illinois, Missouri, and Mississippi, the shilling is equal to  $\frac{1}{2}$  of a dollar, or 16½ cts.; in New York currency, North Carolina, Ohio, and Michigan, it is  $\frac{1}{3}$  of a dollar, or 12½ cts.; in Pennsylvania currency, New Jersey, Delaware, and Maryland, 7*s. 6d.* make a dollar, the shilling being 13½ cts.; and in Georgia currency, used also in South Carolina, 4*s. 8d.* make a dollar, the shilling being 21½ cts. In Canada currency, and in Nova Scotia, 5*s.* make a dollar, and the shilling is 20 cts. Unnecessary and clumsy as are these systems applied to the simple currency of dollars and cents, they still continue in popular use.

SHINER. See DACE.

SHINGLE, a strip of wood, commonly of white pine or white cedar, made about half an inch thick at one end and tapering off to a thin edge at the other, much used in the United States for the covering of roofs. For this purpose shingles are nailed on in rows commencing at the eaves, each row above overlapping that below, breaking joints as in laying slates, and the lower exposed portions being the thicker ends. The manufacture is an important branch of the lumber business, and is often carried on in the forests. The pine or cedar logs are cut into the length of a shingle by a cross-cut saw, and are then split into irregular-shaped blocks called bolts. By means of a long blade struck with a mallet these are riven into sheets, and the finishing operation consists in shaving these down to the required thinness. A peculiar bench is made for this purpose, having a vertical block passing through it, which is adjusted by the foot of the operator and holds the shingle fast while he works it down with the draw shave. The shingles as completed are nicely laid in bundles, the thin ends lapping over each other in the middle, and secured by two sticks, one across the top and the other across the bottom of the bundle, and bound firmly together at their ends. Shingles thus prepared make a light roof lasting 10 or 15 years by occasional introduction of new shingles. Another variety called sawed shingles is manufactured by a special machine in the saw mills with great cheapness and rapidity. The surface of these shingles retains the rough marks of the saw, and when laid upon roofs they consequently arrest the moisture, and hence decay much faster than the shaved shingles. In their manufacture the bolt is not rived, but is fixed in a frame which carries it

first across the line of the saw till just the right thickness is presented for either the thick or thin end of the shingle. It is then run through, the saw slicing off a shingle, and the bolt on its return is adjusted by the self-acting movement of the frame to commence with the thickness belonging to the opposite end for the next shingle. Thus they are rapidly turned off, the thin or thick end of successive shingles coming alternately from opposite ends of the bolt. The edges of each one are immediately dressed by the workman, who runs them over a plane iron fixed in the machine.—Cedar shingles are made in large quantities in Cape May co., N. J., from ancient logs fished out from the bottom of the swamps and marshes near the coast, where they have been submerged in vast numbers for unknown periods. Shingles are of all widths, and their length is either 12 or 18 inches. Shakes are long rough shingles split out of the trunks of trees, and used without further preparation for covering houses in the backwoods. They are laid overlapping each other along the edges as well as at the ends.

SHIP, a term applied in general to all vessels navigating the sea, and in particular to sailing vessels with at least 3 masts carrying square sails. The 3 masts are known as fore, main, and mizzen. The mizzen is sometimes merely fore-and-aft rigged, carrying no yard; the vessel is then known as a bark. Brigs have two masts rigged with square sails, and are generally smaller vessels than ships. They are convenient for handling with few men, and were formerly very popular, especially in the West India trade. Hermaphrodite brigs (partly brig and partly schooner) carry on the mainmast only fore-and-aft sails. They are usually of inferior size to full-rigged brigs. Schooners are two-masted vessels fore-and-aft rigged, carrying jib and flying jib, foresail and mainsail, with a gaff topsail over each of the latter, and a long square sail for the foremast, only brought out for use when the wind blows steadily from astern. The topsail schooner has a square topsail and sometimes a topgallant sail on the foremast, but the lower sail is the usual fore-and-aft foresail. These are light easy vessels to navigate, and excellent sea boats. Cutters used for revenue service were formerly topsail schooners; steamers are now taking their place. When it is desired to increase the capacity of schooners without increasing their draft, they are considerably lengthened, and a third mast is added to them, when they are known as three-masted schooners. Such vessels are common on the great lakes, and are the best adapted of any vessels of their tonnage for working over the flats of Lake St. Clair. Pink stern schooners, or those with high-pointed sterns, were until recently favorite vessels in the cod and mackerel fishery of New England. They carried no jib, but only a foresail and mainsail. Sloops are small vessels, generally less than 125 tons, with one mast. They carry a

jib and mainsail; the latter by the great length of the mast and boom is a very large sail. They commonly have a gaff topsail, and sometimes a square topsail, and a long square sail occasionally set. They are adapted only for rivers and comparatively smooth waters. A vessel is sometimes seen in our harbors with 8 masts, the foremast rigged like that of a ship, and the others schooner-rigged without topsails; this is known as a barkantine.—The nations of antiquity inhabiting the shores of the Mediterranean and Red seas attained no inconsiderable skill in the construction of vessels, and were so successful in the art of navigating them as to make voyages of long duration. Among these nations the Phœnicians were the first known to attain this distinction. In the Old Testament mention is made in the history of Solomon of joint Phœnician and Hebrew naval expeditions to distant countries for the timber used in the construction of the temple and for the gold and precious stones of the land of Ophir. (See NAVIGATION, and NAVY.) The oldest and most famous vessel of which we have any account was Noah's ark; and it is remarkable of this that its proportions of length, breadth, and depth are almost precisely the same as those of the fastest vessels of the present day, as the ocean steamships. It was 300 cubits long, 50 broad, and 30 high. Some of the Atlantic steamers are 322 ft. long, 50 ft. broad, and 28½ ft. deep, and these are dimensions that have but recently been arrived at as the result of experience and skill directed for many generations to the improvement of ships. The ships of the Egyptians, as they appear represented upon their ancient tombs, were long galleys with one mast and a large square sail, which was sometimes of linen colored or white, and sometimes of papyrus with one, and in the later periods with two yards. These were of great size and length, so that men could walk out upon the lower one, holding on by the ropes by which it was suspended from the top. The vessels were made of planks of pine, fir, or cedar, each end rising up out of the water by a long slope, well adapted in shape for easy propulsion, and were furnished with oars, upon which the war vessels were wholly dependent when in action, and all of them indeed except when the wind was favorable. The ships of war alone were decked wholly or in part, and upon the larger ones the deck was high, and in some instances covered with structures resembling houses. According to Pliny, the Thasians were the first to construct full decks. Merchant vessels were round-bottomed for the sake of capacity. The prow was furnished with an elaborately carved figurehead, as a boar's head, dog's head, &c., which was the symbol after which the ship was named. Upon the stern, which rose high out of water, like a Chinese junk, was the image of the tutelary god with other ornamental devices. A peculiar feature in the war vessels was a projecting beak, at first made above the

water line, and afterward below it, armed with pointed irons or the head of a ram, the object of which was to pierce the sides of other vessels against which it was run. This was the only part built of oak or hard wood. The various processes employed in building small vessels, from the cutting down of the trees, are given in the *Odyssey*. An evidence of the want of strength in the construction of ancient vessels, and the necessity in their voyages of avoiding exposure to rough seas, is the fact of their being bound around the outside with broad and thick ropes. The great ships of Ptolemy Philadelphus were provided with as many as 12 such bands, each of which was 900 ft. long. They were sometimes carried on board the vessels, to be put on when needed in rough weather. As the ships depended chiefly upon the use of oars, the arrangements for these were their most marked feature, and gave distinctive names to the several classes of vessels. Those which were propelled with a single bank, or as commonly understood tier, of oars were called by the Romans *moneres*; those with 2 tiers, *biremes*; with 3, *triremes*; with 4, *quadriremes*; and with 5, *quinqueremes*. Ancient writers describe ships with numerous banks, even as high as 40; but it is altogether unintelligible how more than 4 or 5 tiers could possibly be used one above another, or how oars could be long enough to reach the water from the necessary high elevation, and strong enough to exert any force beside bearing their own weight. Some of the ships built by the kings of Egypt, rather for display than for use, were of wonderful size and capacity. One dedicated by Sesostris to the god of Thebes was 280 cubits, or, allowing 18 inches to the cubit, 420 ft. long. Another by Ptolemy Philopator was of the same length, 38 cubits broad, and 48 high; it carried 4,000 rowers, 400 sailors, and 2,850 soldiers. Callixenus describes its oars as arranged in 40 banks, one above another, and those of the upper tier as 57 ft. long. Even these would fall considerably short of reaching the water from the top, which he gives as 48 cubits, or 72 ft., in the bow, and 80 ft. in the stern. The handles of the oars were loaded with lead to counterpoise the blade ends. Another ship of the same ruler, which he used on the Nile, was 312 ft. long, 45 ft. broad, and 60 ft. high, with a mast 120 ft. long. Even these were exceeded by the magnificent ship built by order of Hiero of Syracuse, and under the directions of Archimedes. The wood it consumed was sufficient to build 50 ordinary galleys. It was provided with banqueting rooms, galleries, gardens, fish ponds, stables, mills, baths, 8 large towers, and an engine for throwing stones of 800 lbs. weight, and arrows 12 yards long. Its floors were inlaid with scenes from Homer's *Iliad*, and it contained a temple of Venus and many other wonders. However these accounts may have been exaggerated, there were unquestionably vessels of what would still be considered great capacity occa-

sionally constructed in ancient times, as the one employed by the emperor Constantius to bring to Rome the largest of the obelisks of Heliopolis, the weight of which was 1,500 tons; beside this the vessel carried 1,188 tons of pulse as ballast, and thus loaded arrived in safety at Rome, where the obelisk was soon after erected in the circus of the Vatican. The Greeks learned from the Phœnicians the arts of ship building and navigation, and the Corinthians improved upon the size and shapes of the older models. They were the first to introduce 3 banks of oars, and the ships of this class became so popular and generally used for war vessels that they were frequently designated by the simple term *treres*. The Athenian ships in the time of Themistocles were mostly triremes, only partially decked over in the bow and stern. Those designed exclusively for actual fighting were long and narrow, and carried in general about 200 men. They were capable of being propelled at the rate of about 100 miles in 24 hours, and sometimes their rates were little inferior to those of modern steamboats. The Romans first experienced the necessity of ships of war in their contests with the Carthaginians, who were well supplied even with the high-bulwarked quinqueremes, and skilful in their management. The senate in 260 B. C. ordered a fleet of 130 such to be built, and fortunately a Carthaginian quinquereme wrecked on the coast of Bruttium furnished a model. The whole fleet was completed in 60 days after the trees were cut down; but, thus constructed of green timber, the vessels were poorly fitted to contend with the superior ships of the Carthaginians, and the Romans were long in establishing an efficient navy. They added finally various novel appliances to their war vessels, similar to those they were familiar with upon the land, as high towers and elevated platforms, serving like the high walls of fortresses, also receptacles upon the masts for soldiers, and a great variety of destructive engines. They increased the number of banks of oars as commonly used, making them 8 and even 10. Cæsar in his "*Commentaries*" makes mention of the strong ships of the Gallic Veneti, built wholly of oak, and furnished with iron chains instead of cables for their anchors. The Romans, finding them very difficult to contend with on account of their strength and height, adopted the expedient of hooking scythes attached to long poles in their rigging, and then by pulling away cut the ropes and disabled the ships. A Roman ship of the time of Trajan, sunk in the lake of Riccia and raised after it had lain there more than 1,300 years, was described by Leo Baptista Alberti in his book of "*Architecture*" (lib. v. cap. 12); it was built of planks of pine and cypress, daubed over with Greek pitch and calked with linen rags; the wood was in a good state of preservation; the outside was sheathed with sheet lead fastened with small copper nails.—In the middle ages navigation and ship building declined, and little is known of the vessels of that

period. The expedition made by the Anglo-Saxons under Hengist and Horsa to England, A. D. 449, was in frail vessels, their sides made of wicker work and covered with skins. The Northmen at a later period were probably better acquainted with the qualities of sailing vessels than any other people, and must have understood how to construct them of good models to venture in them across the stormy N. Atlantic in prosecuting their trade with Iceland and their discoveries to the American continent beyond. For war purposes the long low galleys of the Mediterranean had replaced the ancient triremes among most of the maritime nations of Europe. Alfred the Great adopted them in his wars with the Normans and Danes, and in 897 he first made the English navy unequalled. For several centuries, however, little improvement was made in ships. In the latter part of the 14th century the best were of Norman construction; in the representations of their war vessels of this period the rudder is first seen as a substitute for the great steering oars always before in use. In southern Europe the credit of first building vessels to be propelled by sails alone has generally been conceded to the Genoese. In England many vessels of this character were employed as early as 1344. The introduction of cannon in naval warfare at the siege of Calais in the reign of Edward III. gave new importance to this branch of military service, and led to the first regular establishment of the British navy by the enrollment of ships belonging to the crown. Ships of war had been numerous in the reign of John, but owned by individuals; the government provided at that time for their accommodation the royal dockyards at Portsmouth. The ships of these periods were remarkable for the great height of their sides, their bulky rounded models, and the simplicity of their rig. They had no bowsprit, and seldom more than one mast; the sail was attached to a yard, which was let down to the deck when not used. They were navigated by 17 to 20 sailors only. Henry V. added to the number of English ships. His vessels were of 100 to 600 tons each, some with 3, others with 2 masts, with short topmasts and a fore-stage or forecabin built up to a considerable height for the soldiers. At the mast heads were topcastles, in which men were stationed during an engagement to annoy the enemy with darts and other missiles. In the middle of the 15th century William Canning, a famous merchant of Bristol, built many large ships, one at least of 900 tons burden, and employed altogether not less than 2,853 tons of shipping and 800 mariners for 8 years. The navies of several European states, as the Netherlands, Venice, Spain, and Portugal, attained considerable importance in that century. Many of the ships being so far improved as to sail upon a wind, and the compass and astrolabe having come into use, it was now possible to engage in longer voyages and prosecute explorations in unknown seas. The discovery of America and of the

passage round the cape of Good Hope were early fruits of these improvements. The Portuguese employed vessels of small size in their voyages of discovery, as the best adapted for explorations along unknown coasts, but the Spaniards cultivated the art of building large vessels, and long maintained a superiority in this respect. Henry VII. of England built a famous ship called the *Henry Grace à Dieu*, a drawing of which is presented by Charnock in his "History of Marine Architecture." (See Navy.) Each of her 4 masts was made of a single stick, and had 2 topcastles, one above the other, and 3 yards. The bowsprit was a long slender stick with no sail attached to it. Vessels built up like this one with high castelated structures at each end would seem intended rather for display than for actual service, and must certainly have been far inferior sailers to the galleas and galleons of the Mediterranean, which had succeeded to the galleys. These were of moderate height above the water, and the first had overhanging bulwarks like the guards of modern steamboats, greatly adding to the width of the decks and affording room for the rowers. The galleons, on the contrary, which depended on sails alone, were drawn in at the top to such an extent as to contract their breadth from the water line fully one half; this feature has ever since prevailed in many European ships. Henry VIII. introduced many important improvements in naval affairs. He established the dockyards at Deptford and Chatham, and brought together from foreign countries, and especially from Italy, the commercial cities of which were still in advance of the rest of Europe in the maritime arts, many skillful shipwrights and workmen. In the reign of Elizabeth the superior management of the English ships over the much larger ones of the Spaniards, with their 3 tiers of guns, was fully established in the contests with these vessels; and great progress was made under the encouragement of the queen in increasing and perfecting the mercantile marine. The East India company was chartered in 1600, and the increasing traffic with the distant countries of Europe and America rapidly stimulated the demand for the best vessels and called forth the ingenuity of the ship builders. Sir Walter Raleigh gave much attention to the improvement of ships, and his publications entitled "Invention of Shipping," and "Concerning the Royal Navy and Sea Service," greatly added to the general interest in the subject. The shipwrights' company, established in 1605, was incorporated in 1612, and general charge was given to the association over ship building throughout the kingdom. The first master was Phineas Pett, of a family distinguished for the principal engineers it furnished to the royal navy from about the middle of the 15th century to the end of the reign of William III. He built the *Royal Prince* in 1610, a ship of 114 ft. keel, 44 ft. breadth, and 1,400 tons burden, introducing the great improvement of cutting off the



long projection of the prow, hitherto universally adopted, and also much of the cumbersome top hamper of the older ships. The first English 3-decker was built by his son Peter Pett in 1637. She was called the *Sovereign of the Seas*, and had the reputation of being the best man-of-war in the world until she was accidentally burned in 1696. An account of her armament is given in *NAVY*. She was 232 ft. in length over all, 128 ft. length of keel, 48 ft. in breadth, and of 1,637 tons. The drawings represent her as a full-rigged ship carrying square sails altogether, topgallant sails, and royals, but no jibs or staysails. Under the bowsprit was a square sail suspended from a yard, such as is now called the spritsail. The hull was somewhat lofty in the bow and stern compared with modern ships, but still greatly reduced from the older ones. A considerable portion of the additional length above water to that of the keel was from a long triangular beak. The *Constant Warwick*, also built by Peter Pett in 1646, and designated a frigate, was specially intended for fast sailing; she was light with low decks, of 85 ft. keel, 26 ft. 5 in. breadth, 13 ft. 2 in. depth, and 315 tons burden; she carried 32 guns and a crew of 140 men, and soon acquired a high reputation for her conquests among the Dutch privateers. The Dutch ships, however, at this time were quite equal to the English, and their navy was altogether the best in Europe, the result of their continual wars with Spain. The merchant vessels of England were superior in sea-going qualities to those of the royal navy, and during the wars with France and Spain they boldly continued their trading voyages, 2 or 3 of them usually sailing in company. During the 18th century the French attained a decided superiority in the size and models of their ships, and the Spaniards readily adopted the improvements of the French. Their largest vessels were 2-deckers only until after 1763, and their largest armaments were of 84 guns. In this respect they were inferior to the English 3-deckers carrying 100 guns; but in 1768 the French adopted the English system, and built ships of 110 and 120 guns, and of 196 ft. length by 50 ft. breadth and 25 ft. depth of hold, while the English in some instances copied the lines of the French ships that fell into their hands. But it is admitted even by the English themselves that their system of ship building received no aid from the applications of science, while the French availed themselves of the highest mathematical talent as well as of practical experience and skill. To the latter and to the Spaniards also is due the credit of the important improvements made in ship building in modern times up to the present century; and yet in the United States, where the same course has been pursued as in England, of seeking aid only from experience and natural talent, the highest success has since been attained in designing the most perfect models for the special purposes required. With a singular inde-

pendence of old prejudices, the American ship builders were the first to entirely abandon the cherished features of the European models, as the high poop and inflected topside. Their frigates proved their superiority to all other vessels of war in actual service, and before the introduction of steam their Liverpool packet ships were famous as the finest vessels afloat, carrying enormous cargoes, while at the same time their accommodations for passengers were unsurpassed, and the duration of their passage across the Atlantic hardly exceeded half the average number of days required by vessels of other countries. Their fore-and-aft rigged vessels, less known abroad than the larger ships, were still more remarkable for originality and perfect success in their designs. The river sloops and coasting schooners were as peculiarly American and as admirably adapted for their special uses, as the steamboats of our bays and rivers have since become. The schooners of the Chesapeake were especially famous under the name of Baltimore clippers. Broad of beam before the centre but above the water line, sharp in the bow, deep aft, long and low, they presented admirable forms for capacity, for stability to sustain a large amount of canvas, for great speed, and for holding their course on a wind with little drifting to leeward. Their rig was exactly adapted to their model. The masts were long and slender, the sails unusually large for vessels of their size, and of so true cut and perfect set, that no portion of the propelling effect of the breeze that reached them was wasted. Close-hauled, they drew well with the vessel running within 40° or 45° of the wind, while the best equipped frigate would be sharp set at 60°. The superior sailing qualities of these schooners were shown in their success as privateers and freedom from capture in the war of 1812-'14, and were most conclusively established when the yacht *America*, built on the same principles, carried off the prize in 1851 in competition with the English yachts that had confidently challenged the world to a trial of speed. From these schooners the step was a natural one to the famous clipper ships by the adoption of the square rig for larger vessels of similar model, when vessels of this class fitted for carrying valuable cargoes with the greatest expedition to the extreme limits of navigation might be required. They were called into existence by the increasing importance of the East India trade, in which speed and punctuality were more essential than mere stowage capacity; and hardly were their superior sailing qualities made known and appreciated, when the sudden springing up of the California trade with its immense passenger traffic gave to them a vastly increased occupation. In vessels of this class the voyage round Cape Horn lost its terrors, and the passage from New York to San Francisco was confidently calculated within a few days, and this at hardly half its former length. The clipper ship *Great Republic*, built by Mr.

Donald McKay of East Boston, is an excellent type of this class, and particularly worthy of notice as the largest, if not the fastest, merchantman ever constructed. Her capacity is about 4,000 tons, and her original dimensions were 325 ft. length, 53 ft. width, and 37 ft. depth. A peculiar feature in her model is the rising of her keel for 60 ft. forward, gradually curving into the arc of a circle as it blends with the stem. The arch form thus given to her fore foot secures a great increase of strength over that attainable with the prevailing angular form, while at the same time her freedom of movement is materially added to by the superior adaptation of this figure to meet the resistance of the water. Instead of the round bluff swell, common to other classes of ships, which gives to their bows the shape of a duck's breast, her lines are concave forward and aft up to a few feet above the load displacement line, but those above this gradually become convex except in the bow, in which the angular form is preserved entire. Ease and grace, however, are imparted to this part of the ship by the rise of her sheer, which is nicely graduated throughout her length, as are all her lines and mouldings to correspond with it. Her stern is semi-elliptical in form. Her decks are 4, separated by 8 ft. spaces. On the spar deck she carries 4 large boats, 2 of them of 20 tons each, 80 ft. long, 10½ ft. wide, and 5 ft. deep, fitted with sails and all the other appliances for preserving life in the event of disaster to the ship. She has also 4 quarter boats of 26 ft. length, and a captain's gig of 22 ft. A room is devoted to a steam engine of 12 horse power, which does all the heavy work of the ship, such as taking in and discharging cargo, setting up rigging, working the fire engine, hoisting topsails, pumping ship, &c.; and connected with it is an apparatus for distilling fresh from salt water. Her timbers were carefully selected of the best qualities; her keel is of rock maple in two tiers, which combined are side 16 inches, and mould 32; and her frame is of seasoned white oak. Her masts are 4 in number. The after one, which is called the spanker mast, is fore-and-aft rigged. This is of a single spar; the others are built of hard pine, the parts dowelled together, bolted and hooped over all with iron. The bowsprit is built and hooped in the same style. The main yard is 120 ft. long. A spare set of her heavy spars are stowed on the upper deck below the spar deck, and an oblong opening on each side the ship through the latter admits their passage. A single suit of her sails covers 16,000 square yards. They are of an improved cut designed to secure the most perfect set, and their stitching was in part effected by machine sewing. Lightning rods are attached to all her masts. She has 4 anchors, the best bower weighing 8,500 lbs., the working bower 6,500 lbs., the small bower or stream anchor 2,500 lbs., and the kedge 1,500 lbs. Her bower chains are each 120 fathoms long, and of 2½ inch iron. The sailing ca-

capacity of this ship is quite equal to that of others of her class. When employed as a transport ship by the French government in the Crimean war, she astonished the officers of the expedition by leading off in ordinary weather the steam vessels of the fleet that were to have taken her in tow. Even in 1851 the performances of some of the clipper ships on long voyages were far superior for days together to those of the steam vessels of that time, and on the whole run hardly inferior to them; and as the great progress since has been in perfecting the latter, so that sailing vessels are now giving way to those propelled by steam, it is probable that the wonderful results hitherto attained by the clipper ships will always stand recorded as the greatest achievements of sailing vessels. In 1851 the *Flying Cloud* made the passage from New York to San Francisco in 89 days and 21 hours. Her greatest distance from noon to noon of any day was 374 knots (433½ statute miles), which, allowing for difference of longitude, was made in 24 h. 19 m. 4 sec., or at the rate of 17.77 m. per hour. In 1853 the *Comet* arrived in New York from San Francisco in 83 days, and the *Sovereign of the Seas* from the Sandwich islands in 82 days. The greatest distance made by the latter from noon to noon in any day (in this case 23 h. 2 m. 4 sec.) was 362 knots (419 m.), or at the rate of 17.88 m. per hour. From March 9 to March 31, from lat. 48° S. in the Pacific to 36° S. in the Atlantic, the ship made 29° of latitude and 126° of longitude, equal to 6,245 statute miles, or a daily average of 288.9 m. During 11 of these days consecutively her daily average was 354 m., and during 4 consecutive days 398½ m. Her daily average for the whole distance of 17,597 m. was 222.7 statute miles, or at the rate of over 9 m. an hour for 1,896 consecutive hours. The two prominent features that distinguish these and all fast ships, and constitute the essential improvements of modern times, are the shape of the bow and the increased length of the vessel. As already described in the account of the *Great Republic*, in place of the convex form noticed in the older ships in tracing the lines from the stem aft along and below the water, is now substituted a concave surface giving to the bow the shape of an elongated wedge slightly hollowed on the face, by which the waters are more easily parted and thrown aside as the ship makes her way through them. This wedge shape is extended even to beyond the centre of the ship, so that the broadest part, instead of being as formerly one third the distance from the bow, is now about the same proportional distance from the stern. Above the water line the old proportions may still be retained. This form of bow is not by any means altogether new, having been adopted by the Spaniards in past times and by various barbarous nations for their small craft; but its merits not being appreciated by other European nations, it was sacrificed for the sake of greater stowage, especially by

the English, who were the more impelled to this course by reason of the old tonnage laws, in force up to 1836, as regards the method of measurement for regulating the dues, the increase of capacity gained in the bow not being reckoned in the estimate. Thus the round swelling bow became the established form, in the correctness of which the builders felt confirmed by the similar shape in the head of the whale and of the codfish. The hollowed lines drawn from the stem back on each side the ship were designed by Mr. Scott Russell from his observations made as far back as 1832 upon the shape of the wave set in motion, as by the influx of water from the discharging of a lock of a canal, which travels at rates corresponding to the depth, as 8 m. an hour for 5 ft. depth, 10 m. for 7 ft., 15 m. for 15 feet, 18 for 20, 20 for 30, 25 for 40, and 30 for 50. Hence he designated them wave lines, and the form of the bow they produced he called the wave form. The lines for the stern he also established by study of the refilling or replacing or following wave, as necessarily falling in cycloidal curves. The length of these, or that of the run, should be about as 2 : 3 in relation to those of the bow ; and as the length of the two sets is increased, so is the capacity of the ship for speed. Definite lengths indicate definite rates with a given power, and it would be impossible to force a ship through the water at rates much exceeding those indicated as adapted to the length of her lines without an extravagant expenditure of power. Additional length of body inserted in the centre seems to have no effect, except as it presents an increased surface for adhesion of the water. Thus the old idea that there must be a certain proportion between the length and breadth of a vessel, as that which for a long time was adopted in practice of one fourth the length for the breadth, proves to be entirely false. The speed does not appear to be affected by the shape of the vessel across her middle or her midship section, nor by differences of depth to a considerable extent. The lengths of ships adapted for certain rates, as laid down by Mr. Russell, are as follows: for 6 m. an hour, at least 30 feet—18 ft. for the entrance and 12 ft. for the run; for 8 m., 50 ft.; for 10 m., 70 ft.; for 12 m., 100 ft.; for 15 m., 150 ft.; for 18 m., 200 ft.; for 20 m., 300 ft.; for 25 m., 400 ft.; and for 30 m., 500 ft. It is on these principles that the great experiments of the English in the construction of their largest steamers have been made. Before their adoption it was taught by the most experienced ship builders, and in this opinion Mr. Scott Russell was himself educated, that it was impossible to force steamboats through the water at a greater rate than 9 m. an hour. He had even seen engines of 50 horse power taken out of one of the short bluff bow steamboats, and replaced with others of 75 horse power, with the effect of increasing her speed only about a quarter of a knot an hour. With the increased power the resist-

ance in front was much more than proportionally increased, keeping down the speed in this instance to about the same amount. This was in accordance with the mathematical deduction of the resistance in passing through water increasing at a higher ratio than the square of the velocities; and it is not strange therefore that the opinion prevailed, that if a rate of 12 or 14 m. could ever be attained in sea-going steamers against the enormous resistance, increased as it must be by the tremendous shock of opposing waves, no vessel could be constructed sufficiently strong to complete a voyage. Yet, in the United States the fallacy of these views had been practically demonstrated in the steamboats on the Hudson river for several years before the principles of their success were recognized by the English ship builders. In 1827 these boats were making the trip from New York to Albany in 12 hours, the distance being about 150 statute miles, and the trip usually including 12 stoppings, at 6 of which the boats were brought to and fastened to the wharfs. Several crossings of the river also added to the distance and the time over a trip direct. In 1829 the passage had been accomplished in 10½ hours, in 1831 in 10¼ hours, and in 1832 in 9 h. 18 m. (See paper by William C. Redfield in "American Journal of Science," vol. xxiii., 1833.)\* These boats were long and sharp, furnished with "cut-water bows," and of dimensions in some instances as follows: length 233 ft., breadth of hull at the water line 28 ft., depth of hold 10 ft., draught of water 4½ ft.; length 180 ft., breadth at the water line 28 ft.; length 220 ft., breadth 25 ft.; and length 145 ft., breadth 27 ft. The reports of such results could not fail to be received with the greatest surprise and incredulity in Europe; but in 1832 Mr. Russell demonstrated theoretically the principles upon which such speed was attainable, and in 1837 a river steamer called the *Vesper*, built on the lines he recommended, was actually run on the Thames at about 12 m. an hour. The direction in which improvements in the construction of fast ships were to be made being thus determined by theory and practice both in England and the United States, an active rivalry sprung up between the two nations, each producing almost every year steamers of surpassing excellence, and striving to secure to itself the carrying trade between the two countries. The English, impelled by the success of the American Collins line of steamers, 4 of which, built in 1850, had proved quite equal if not superior in speed to their own fastest ships, put forth every exertion to surpass them, and prevent if possible the Americans attaining their threatened superiority upon the sea.

\* Since the publication of the paper by Mr. Redfield still increased rates of speed have been attained by these boats, till, in Oct. 1860, the steamboat *Daniel Drew* made the trip in 6 h. 50 m., including in this 5 landings and several crossings involved by them; these may fairly be considered as consuming 50 minutes, thus making the rate 25 m. an hour, the highest speed ever recorded upon the water.

The two governments entered into this rivalry, each aiding its own ship builders by its patronage. But the American government at last withdrawing its aid, the scale turned in favor of the English, whose resources were greater in other respects than those of the Americans. This was especially apparent when in the course of the contest it was discovered that a limit was encountered to the required elongation of the ships, in the want of strength in wooden timbers, however large and well put together, to bear the increased strain; and that resort must be had to iron plates riveted together, the suitability of which for such use was fully established by the success of the Britannia bridge, a structure 460 ft. long supported only at the ends, and bearing with safety a passing railway train. The cheapness of this material in England, and the experience already acquired there in its use, not merely for bridges but for steamers also, ever since its first application of the kind by Mr. William Fairbairn of Manchester in 1830 and 1831, enabled the English to adopt it as soon as its need was felt for first class steamships; and in 1855 the Cunard iron steamer Persia was constructed, of 360 ft. length of hull, 45 ft. breadth, and 32 ft. depth, and of capacity exceeding by 1,200 tons the largest of the other ships of the same line. She was the largest and strongest steamer ever built up to that time. Her keel is of heavy iron bars each about 85 ft. long, joined together by long scarfs, making the whole 13 inches deep by  $4\frac{1}{2}$  inches thick. The stern post is 13 inches in breadth by 5 in thickness, and the rudder stock is of 8 inches diameter. The iron ribs, 10 inches deep, are set only 10 inches apart, and are strengthened with double angle irons at the outer and inner edges. The plates at the bottom of the ship are  $\frac{1}{2}$  of an inch thick, from this to the load water line  $\frac{3}{4}$  of an inch, and above this  $\frac{1}{4}$ , excepting round the gunwale, where they are  $\frac{1}{2}$  of an inch. There are 7 water-tight compartments, 2 of which for the freight are provided with independent water-tight iron bottoms. Although the largest, costliest, strongest, and safest vessel of the time, her speed was but little if at all superior to that of the American steamers. The next of these grand attempts was the construction of the Great Eastern, in which the principle was put to an extreme test upon a length of hull of 680 ft., a breadth of  $82\frac{1}{2}$  ft., and depth of 58 ft. Her lines were designed by Mr. Scott Russell in exact conformity with his theoretical wave lines. Those of the bow are 330 ft. in length, and the length of the run is 226 ft., the filling in of parallel body to afford the capacity wanted being 120 ft. This middle portion, as already remarked, is supposed to have no effect so long as the length in other respects is sufficient for attaining the required speed with the given power. In this case the power furnished could be expected to give only 15 m. an hour, and in attaining this the great ship

cannot be regarded otherwise than as a successful experiment, although owing to other considerations she may have proved a commercial failure, and difficulties from unexpected sources have attended the welding and control of so vast a structure. As a matter of prudence it would no doubt have been more judicious to advance to these huge dimensions by successive steps; still the experience gained in running the Great Eastern cannot fail to prove most valuable, leading to her own perfection by remedying her defects as they are developed by repeated trial, and to their avoidance in other gigantic vessels, the construction of which must soon be undertaken to meet the increasing requirements of commerce. Already indeed the newspapers announce the formation of a new Atlantic steamship company in England, which proposes to build other large steamers more especially designed to make the trip across the ocean in 7 days, which from Bristol to New York would require an average rate of about 17 knots. It is reported that their maximum speed may be about 30 statute miles an hour. To attain this they are to be provided with steam power nominally the same as that of the Great Eastern, while their length will be reduced to 660 ft., their breadth to 75 ft., and depth to 30 ft. The great reduction is in the last measure, by which their draught of water will be 9 feet less than that of the Great Eastern, or 17 or 18 feet only, and their capacity of stowage only about one half as much. The last, however, will still be about 3 times that of the Great Republic, quite large enough to be conveniently provided for at all times in the principal ports of the world, while by their moderate draught they will possess the advantage of being able to enter all ports accessible to first class sailing vessels. These ships are to be strengthened by 3 water-tight longitudinal bulkheads from bow to stern, making throughout the length 3 equally wide divisions, and these will be crossed by other partitions of the same character so as to make in all 50 water-tight compartments. The accommodations will be sufficient for 1,991 persons and 5,000 tons of cargo. Two sets of engines will be applied to each of the two screws, one under each quarter; the paddle wheel on each side is to be worked by its own engine, and as no through shaft will connect them, the movements may be entirely independent of each other, working if need be in opposite directions, and the screws the same, to turn the ship in any desired direction in case of failure of the steering gear. The principle of this arrangement was first adopted in the earlier steamboats employed on Long Island sound between New York and Providence.—For further account of the use of steam in navigation and the history of this application, see *STEAM*. This is the great improvement of modern times in the construction of ships; and next to it in importance will probably prove to be the substitution of iron for wood

as their material. This, as already observed, was first made in 1830 and 1831 by Mr. William Fairbairn of Manchester, who then built 3 small iron steamers which made the voyage from Liverpool to Glasgow, and showed such symptoms of strength that Mr. Fairbairn was encouraged to enter largely into the business. Within the succeeding 4 years he constructed an iron vessel for the lake of Zürich, and two river steamers of about 170 tons for the navigation of the Humber. He then became associated with the Messrs. Laird of Birkenhead, and with them up to 1848 had constructed above 100 first class ships. In France and in the United States iron has been partially introduced into wooden ships, bars of iron being employed to great advantage for a diagonal framing, covering the inner surface of the timbers with a complete network; horizontal stringers of plate iron are also fastened to the sides within at intervals from the deck to the keelson, which is also of iron. The beams are also made of iron, shaped like those used in house architecture, and in various other parts this metal is substituted for wood, the advantage being greater strength with less weight and the occupation of less room. Ships constructed wholly of iron are lighter than those of the same tonnage made of wood, and consequently can carry larger freights. Their size moreover being capable of enlargement beyond the dimensions to which wooden vessels must be limited, they admit more than the latter of profiting by the principle, that the larger the capacity the less proportional part of it need be devoted to the transportation of the fuel required, and the more may be devoted to the cargo. Hence the largest ships may carry their own coals for the longest voyages and their return to port without the necessity of purchasing supplies at intermediate stations at great cost, and with still abundant room for other cargo. Iron ships are built upon a frame of ribs and longitudinal pieces, upon which the outer plates are secured by bolts and rivets passing through their overlapping edges. The following are some of the requirements of an iron ship of 3,000 tons or more in order that she may stand as A1 upon Lloyd's register. The necessity of conforming to them, it is objected, seriously interferes with the introduction of improvements in the construction. Some of the technical terms introduced will be explained in the account that follows of the method of building wooden ships. The figures in each case are inches. The keel, stern, and stern post must each be of not less section than 12 by  $3\frac{1}{2}$ . The upright ribs 18 inches apart, and formed of angle iron of  $6\frac{1}{2} \times 4 \times \frac{1}{4}$ . The thickness of plates for garboard strakes, to stand as A1 for 6 years,  $\frac{1}{8}$ ; for 9 years, 1 inch; for 12 years,  $1\frac{1}{8}$ . For the upper strakes for the same times respectively,  $\frac{1}{4}$  inch less. The thickness of plates for beams,  $\frac{1}{2}$ ; for bulkheads,  $\frac{3}{4}$ . Angle iron for beam, stringers, and keelson,  $6\frac{1}{2} \times 5\frac{1}{2} \times \frac{1}{2}$ . Thickness of wooden

planks for upper decks, &c., 4 inches. Even the sizes of the rivets are fixed for the several thicknesses of plates. For  $\frac{1}{8}$  plates the rivets must be at least  $\frac{1}{16}$  in diameter;  $\frac{1}{4}$  plates,  $\frac{1}{8}$ ;  $\frac{3}{8}$  plates,  $\frac{1}{4}$ ; and 1 inch plates,  $\frac{1}{2}$ . The strength of rivets has been tested in the series of experiments of which the report was published in the "Transactions of the Institute of Naval Architects" in 1860. In 1858 a steamer called the Rainbow, of 170 tons and 130 ft. length by 16 ft. beam, intended for the Niger expedition, was built with plates of steel. These were rolled from lumps of crude steel which were exposed 4 hours in a close furnace to a temperature a little below the melting point; by this process the steel was made to assume a more homogeneous texture and uniform strength. Its advantage over ordinary iron plates is that equal strength to that of the latter is obtained with only half the weight. The boilers of the steamer were also made of it.—The recent changes of importance in ships intended for naval service are: 1, the introduction of light and swift vessels propelled by steam, carrying a few heavy guns, and able by their light draught to run into rivers and shoal waters (see GUN BOAT); and 2, that of floating batteries, some account of which has already been given in the article BATTERY, vol. ii. p. 742. Since that account was published in 1858, the French and English governments have constructed other vessels of the character of those described, and measures have been taken to hasten the completion of the large battery at Hoboken, while the construction of other plated ships of light draught has been commenced at Philadelphia and other places by the American government. The French in 1860 launched a wooden ship of this class, called La Gloire, of 252 ft. length, 55 ft. beam, and 27 $\frac{1}{2}$  ft. draught to the load water line, carrying on a deck that must be brought by the weight of the armor within 6 to 7 ft. of the water 84 54-pounders, and on the forecastle 2 screened heavy shell guns. Her armor is of iron plates 2 ft. wide and  $4\frac{1}{2}$  inches thick, extending from stem to stern and some distance below the water. The ship sails well, making under full steam 13 $\frac{1}{4}$  knots, and with half her fires lighted 11 knots, and works easily in a heavy sea. She is a screw steamer with engines rated at 900 horse power. The English have built two still larger vessels of the same class and much superior construction, named the Warrior and Black Prince. They are of iron, 380 ft. long (extreme length 420 ft.), 58 ft. beam,  $41\frac{1}{2}$  ft. depth from spar deck to keel, 26 ft. draught of water, and of 6,177 tons, builder's measurement. They are screw propellers, each with 1,250 horse power engines. The middle portion of the hull, 205 ft. in length, is protected by  $4\frac{1}{2}$  inch plates of iron, backed with two layers of teak timber, one of 10 inches next the armor, and another within that of 8 inches. The plates extend 9 ft. below load water line. Across the ends of this protected portion bulkheads of the same materials and thickness are

built across the ship. Six water-tight compartments are thus enclosed, within which are the engines and stores, each of the two boilers having its own independent room. The main deck ports are  $8\frac{1}{2}$  ft. above water (at the load water line). The armament as originally planned, but which may be considerably increased, was 48 guns in all, viz.: 36 68-pounders, of 95 cwt., for the main deck, 10 Armstrong (70-pounders) on the spar deck, and 2 pivot (100-pounders Armstrong), one at each end. The rig is that of a bark. Though one of these vessels required for her armor 900 tons of metal, and has cost about £400,000, two others much larger are already projected, to be completely encased with plates  $5\frac{1}{2}$  inches thick to the extent of 2,000 tons weight for each vessel. They are to be built with a projecting beak extending 20 ft. forward under the water, which is designed to serve like those of the ancient galleys as a powerful ram. Over it an armor shield  $7\frac{1}{2}$  inches thick will cross the ship, having 2 portholes for 200-pounder Armstrong guns. Such vessels only are fitted to encounter the improved rifled guns of modern invention. (See *RIFLE*.) They are designed not merely for harbor defence, but for service at sea and abroad. The appropriation for their construction by the parliament of 1861 was £2,500,000; but the projected operations will cost, it is estimated, not less than \$39,000,000.—*Ship Building*. Few if any mechanical operations demand such a variety of considerations as the building of a ship. A hollow shell is to be constructed in which lightness and stability are the first requisites, that the ship by its buoyancy upon the water may safely support the largest possible cargo. If the vessel be a man-of-war, it is a nice point to determine her displacement, or the entire weight of the structure itself with all that she carries of spars, armament, men, supplies, &c., that from this her depth in the water may be known and the line of her lower ports be fixed sufficiently high not to be washed into in time of action. The form is to be specially suited for easy and rapid progress through the water, and at the same time must be adapted to resist the severest strains, caused not merely by the weight of the structure and of its load, but by the shock of the waves, and their constantly varying figure, the effect of which is to continually change the places of support, and throw large portions of the weight first upon one point and then upon another. It has often been observed that after a vessel has left the stocks upon which she was put together, and lies upon still water, a line that had previously been drawn straight along her top side from stem to stern is deflected several inches by the settling of the ends, which is owing to a want of precision and strength in the work to meet the inequality of the weights on the different transverse sections. The effect is to separate to some extent the planks and connecting pieces at the top, and compress those in the bottom of the structure. When the ship enters into rough water,

she is at one moment supported at the two extremities like a bridge, and the great weight bears down the middle, threatening to bend the whole structure and produce the effect called sagging; the next instant her bow and stern hang unsupported over the great wave which bears up the ship across her centre, and the two ends tend to droop under the weight suddenly thrown upon them; the latter change of form is called hogging. If the ship was thus affected when first launched, it is obvious that the distortion must increase as she works in a heavy sea, and that her timbers and fastenings must be greatly weakened by the motion. In various other ways the strength of her framing is severely tried. Driven obliquely across the waves, she is lifted high upon their summits, and at any moment is dashed into the trough against the next coming swell, the force of which she receives upon her bow, side, or quarter, with a shock that quivers through every timber. For an instant her course seems to be arrested, till, apparently having gathered strength, she is once more upon the top of the sea and again pursuing her career. When following too nearly the line of the waves, she is rolled violently from side to side, and the great weight and long purchase of the heavy yards and masts act with fearful power to strain the sides, to which they are fastened by the shrouds and stays. Again, when moving directly across the waves, each end is in turn elevated and depressed as she rises up to mount the steep slopes on one side, and presses headlong down them on the other. In all these movements the force of the strain is told by the creaking of the timbers, as they feel it successively in different directions. The structure is put to still severer tests when the ship touches an uneven bottom, and the weight is supported by a few points upon a hard unyielding surface. Then, beaten by the waves, raised up and dashed down again by them, her frame is most perfect if she is not soon parted and broken up by the gigantic forces which have her at this disadvantage. Indeed, the only vessels ever known to come off from a rocky exposed coast after remaining aground for a considerable time were iron ships, as the Great Britain, which lay a whole winter on the coast of Ireland, and the Vanguard, which was for several days upon a rocky beach. The strength of ships, like that of roofs and bridges of long span, depends on the skilful arrangement and fitting of the timbers, so that they shall take the strains they are to meet to the best advantage, as well as on the bolts and fastenings by which they are held in their places. The keel is the foundation or backbone upon which the whole structure is built up. It receives the great upright timbers of the stem and stern, and those called floor timbers that support the ribs, which give form to the sides. The deck timbers at different stages, securely fastened at their ends to opposite ribs, hold these together against any spread of the sides or lat-

eral hogging, and also act as struts to prevent collapsing of the sides. Curvature on the length of the ship is guarded against by the planking on the ribs and that of the decks, the planks being laid longitudinally and strongly bolted down to the timbers. In northern Europe since the middle of the last century a system of trussing has been introduced for greater security in this respect. Three parallel rows of pillars were set up extending from one end of the ship to the other, one row on the keelson, and one each side on timbers laid for the purpose and bolted to the ribs. On the top of the pillars of each row and directly under the lower deck was secured a longitudinal timber like an architrave; and diagonal braces extended from the top of one pillar to the foot of the next in the same row. By such arrangement the stiffness was materially increased, but at the expense of stowage room, and the trussing was not altogether secure of remaining in place in the violent movements of the ship. A much superior method was introduced in 1810 by Sir Robert Seppings, surveyor of the navy, which is known as the diagonal bracing. This was formed of a system of timbers crossing the ribs on the inside of the ship at angles of about  $45^\circ$ , and braced by diagonals or struts. This framing started below at the keelson or horizontal timbers at its side, to which it was strapped down, and terminated above under the horizontal shelf which supported the ends of the cross beams under the lower deck. The shelf was thus braced up and supported; and in large ships the second horizontal shelf was likewise sustained by a continuation of the diagonal bracing above the lower deck. These shelves secured to the sides of the ship are always provided for the support of the deck beams, and serve themselves to stiffen the structure in their action like internal hoops. In place of this method iron plates or straps are now commonly employed in all important wooden ships for diagonal bracing. They are laid one set over another, each crossing the timbers diagonally and secured down to them by bolts passing through both straps at their crossing and through the timber beneath them. The straps are from 3 to 6 inches wide, from  $\frac{1}{4}$  inch to  $1\frac{1}{2}$  in thickness, laid only 2 or 8 feet apart, and often cover the sides within from near the keelson to the top sides.—In designing a ship, the old plan, after deciding on her tonnage, is to determine the proper midship section for the proposed capacity, with due reference to the desired speed, degree of stability, &c. The next thing is to plan the horizontal section called the load water section, and then prepare the drawing on a scale of  $\frac{1}{4}$  inch to the foot. The 3 principal draughts are known as the sheer plan, the half breadth plan, and the body plan. The first is a vertical section extending the whole length of the ship, and presenting her full depth, the inclination of her stem and stern, her masts, ports, water lines, and generally

whatever belongs to the side of the ship. The water lines are drawn straight and parallel, and are numbered from stem to stern. The half breadth plan is a horizontal section of half the ship divided lengthwise as seen from above. The several water lines, numbered as in the sheer plan, are dotted in, or drawn in blue ink, and designate the width and horizontal curves of the hull at the different levels. The body plan is a midship section, representing the height and breadth of this portion of the ship; it is divided vertically into two halves, that to the left showing the curves and arrangement of the timbers toward the stern, and the other those toward the bow; the heights of the several water lines are also indicated. Instead of these plans, the American ship builder has generally substituted a half model of the vessel built up of thin strips of wood laid horizontally upon each other. These strips represent the parallel water lines, and can be taken apart for any alteration of the plan, or for laying off from them the full size lines upon the floor of the moulding loft. This loft is a large room specially devoted to the preparation of the designs and patterns from which all the timbers are to be shaped. The designs being drawn upon the floor, the plank patterns or moulds are obtained from them, which are of the exact dimensions of one face of the timber, and are furnished with marks that designate the other dimensions. The workmen provided with these moulds select their timber in the ship yard, and proceed to convert it into the required shapes. The ship yard is situated by the edge of the water, and sufficiently elevated above it to secure a proper slope for the vessel when completed to slide down the ways. At a convenient distance out of the reach of the tide a row of blocks, 4 feet or more apart, and 8 feet high, is set in the ground, extending back from the water the proposed length of the ship, and their flat upper surface sloping toward it about  $8^\circ$  from the horizontal. On these blocks the timbers which make the keel are laid, being nicely fitted together by scarfing and secured by bolts. In Europe elm is preferred for the keel, being a tough wood, holding the fastenings well, and long remaining sound under water; but in the United States white or live oak is commonly used. The latter is the most valuable native timber employed in ship building; but white oak of second growth obtained near the coast in New England is also excellent, and far superior to the same timber brought from the interior. Locust is strong and durable, and cedar and hachmatac are valuable for the excellent knees of great durability which they furnish. Chestnut is employed to some extent, and white and yellow pine are largely consumed, the latter making the best floors for the decks. It is recommended that the trees be killed by girdling in the beginning of the winter when the sap is down, and left to dry and harden before they are felled. After this the timber should be stored in a dry airy place to



season. Keels are sometimes made with false pieces 4 to 6 inches thick secured under the main timbers, the object being to provide a deeper hold upon the water to prevent leeway, and also, in case of grounding upon a rocky bottom, to provide pieces that may be torn off and possibly release the ship with no injury to the main structure. At that end of the keel usually next the water is set up the stern post inclining back from the ship, its lower end or heel tenoned to enter the mortices in the keel. As this is one of the most important timbers, having to support the rudder and the cross beams of the stern frame or transoms, it is made of great strength in a single piece if possible, and at the lower end as wide as the keel itself. At the other extremity the stem post is fixed to the keel, curving upward from it to give the shape of the stem. This timber is also as large as the keel, and is usually in several pieces. Within the stem post are secured to it other timbers of equal breadth and greater thickness than this post, following the same curve and making what is called the apron. At the lower end this is secured to the keel by a knee. In fixing this basis of the framework extreme care is necessary that the parts be exactly in line and their plane perfectly vertical; otherwise some crookedness will inevitably appear in the finished structure. Near each end of the keel there are portions more or less deep, which on account of the thinness of the ship in these places admit no room for framing, and must be filled in solid. This is done by timbers of proper curves nicely fitted to the keel and to the apron of the stem and to the stern post, which are carefully built up as far as necessary, and curved to fit the bottom line of the ship's body. These timbers are known as the dead wood. The floor timbers are now let into the keel, crossing it except near the bow and stern at right angles, with a long and short arm on each side alternately; it is to these that the great side timbers called the futtocks are attached, the first or lower one coming down to the keel, by the side of the floor timbers, to which it is fastened by bolts or tree-nails. The second futtock stands with its lower end or heel upon the head of the floor timber, and is supported by being bolted to the first one at its side; the third stands on the end of the first, and is bolted to the second; and thus they are built up to the number of 4 in large ships, the termination above being in what is called the top timber. It is the futtocks that give the external shape of the side of the ship, and they are consequently made of a variety of lengths and shapes to fit the varying curves. The floor timbers toward the stem and stern are directed respectively forward and aft to meet the curve of these parts, and increase the strength of the structure by opposing their ends to the directions whence the heaviest shocks are to come. After the floor timbers are secured to the keel, they are next covered with a longitudinal timber called the keelson, which extends from one

end to the other, uniting with the stem and stern posts, which may be regarded as its continuation. It is notched for the floor timbers to let into it, and is thus brought down close to the keel, to which it is secured by bolts extending entirely through the keelson, floor timber, and keel. In some ships the spaces between the floor timbers and lower futtocks up to the lowest deck are filled in solid with timbers called dead wood, and these being calked there is no necessity for inside planking. The lower part of the structure is thus considerably strengthened against longitudinal compression, such as must occur in hogging. Another advantage is, that in filling the empty spaces with solid wood, which must be sound, no collection of deleterious gases can be formed among the timbers such as soon cause dry rot. The usual precaution taken against this evil is to fill in salt between the timbers and in holes bored for the purpose. For this the best kinds should be selected, that are entirely free from chloride of magnesium, and thus the objection of dampness caused by the inferior salt attracting moisture is avoided. (See SALT.) The various methods in use of protecting timbers from rot have been noticed in the articles DRY ROT and PRESERVATION OF WOOD. The frame being built up, the uprights are temporarily secured by longitudinal ribbons, which are bolted down to them, and also by cross pauls or planks fastened to their sides and extending across the structure. The latter afford a convenient means of testing the symmetry of the framing by dropping from the middle point of each one a plumb line, which should fall on the centre line of the keelson. If it fail to do this, the timbers must be adjusted by the shores on the outside reaching to the ground. The structure is now ready for the planking, which is to cover the outside and inside, and bind the timbers securely together. The arrangement of the planks is a matter requiring careful study, and must be planned to insure the greatest possible strength and the least waste of material. The planks are sawed the whole width of the tree, and are consequently wider at the butts than at the tops. To keep every other seam parallel with the water line, they are therefore laid on with the top and butt ends of adjoining planks in contact, and are fitted to each other so as always to break joints; and many other precautions have to be observed as regards their ends not coming opposite the joints in the timbers under them, nor in a number of other positions which would tend to diminish their useful effect. The lowest tier or strake of planks outside, known as the "garboard strake," meets the keel along an angular recess called a rabbet, which is cut into its side for the purpose of affording to these planks a tight fit along their lower edge. The keel is thus interlocked along its whole line between the planks each side of it. In large ships this lower tier is sometimes of timbers rather than of planks. The other

planks are from 3 to 6 inches thick. To obtain the curves required for the planks to fit the bends, these are steamed in tanks prepared for this purpose, and then are brought into shape by forcibly bending them with screws and levers between fixed supports. The inner planking, known as the ceiling, commences near the keelson with what is called the limber strake, extending along the whole bottom of the hold, one on each side the keelson. The narrow space between is for a gutter to collect the drainage water, for delivering it to the pumps. Such a passage is called a limber. The strakes over the heads and heels of the timbers are thicker than elsewhere to give additional security against their ends being pressed in. As the planking is carried up, the projecting pieces called shelves are set in their places and strongly secured, the deck beams are laid upon them, and the ends of these are fastened with wooden or iron knees of great strength. Under the middle of the beams are also placed pillars for their support, starting from the keelson. These prevent the settling of the beams, which are arched upward, and their consequent thrusting outward of the sides instead of tying them to a fixed width. As in the rolling of the ship a powerful strain is exerted to lift the ends of the beams up, this is also guarded against by another projecting timber set in the planking directly over the beams. This is called the water way, and is secured by vertical bolts extending through the beam and shelf, and by horizontal bolts that pass through the frame and outer planking. The planks are fastened to the timbers by treenails or pins of locust, the holes bored for which are sometimes left for the timber around them to season and the planks to shrink after they are fitted together and temporarily secured. Small holes with iron pins are used for this purpose, and these holes are afterward enlarged in the directions required by the shrinking. Treenails have recently been made with a thread cut round them and a square head by which they are seized and screwed into the holes. For covering the decks yellow pine planks are commonly used, except along the sides of the ship, where a strake of hard wood thicker than the rest of the planks is laid for a waterway. In laying the deck planks attention should always be directed not merely to their use as a covering, but also to their action as longitudinal ties for the frame. The strakes for this purpose should be as long as possible, and all firmly bolted down to the beams; and it is well to add beneath the deck strakes of iron plates. The planks have in some instances been laid diagonally from one side to the other, obviously involving a loss of strength; ships have also been built with 3 layers of planks for the decks and outer covering, 2 diagonal layers crossing each other, and a third upper layer running longitudinally. At the ends of the ship the shelf pieces, waterway planks, and strakes are secured to the beams, and crutehes attached to the

stern post and to the timbers called breast hooks, that spread out from the stem. The several openings left in the deck for hatch and ladder ways necessarily weaken it somewhat, though they are provided with stout framing secured to the beams. The holes for the masts are large enough to receive wedges all around of 3 to 6 inches thickness. For supporting the masts blocks called steps are fastened to the keelson, or for light masts to one of the beams, and into a cavity of these blocks the heel of the mast is set. A great variety of work still remains for the ship carpenter to complete before he can give place to the calker, whose office it is to make the seams of the deck and outer planking water-tight. The bulwarks have to be finished, the pumps placed, the capstan or windlass for raising the anchor, the catheads for suspending it over the sides, &c. The calking consists in driving slivers of oakum, rolled up in the hand, into the seams between the planks; and that it may reach to the bottom of the opening and make the seam perfectly tight, it is necessary that the planks, even when of great thickness, as 6 to 10 inches, should be bevelled on the outer edge to present an opening gradually closing toward the lower end. The width of the opening is sometimes increased by driving in an iron wedge-shaped tool, and the oakum is then crowded in with great force by the calking iron. When the seams are filled they are payed over with melted pitch; but a much better material sometimes used is the marine glue, prepared from gum shell lac and caoutchouc. (See GELATINE, vol. viii. p. 125.) The rudder is sometimes hung before launching, but more frequently afterward. This appendage to the ship, by which it is steered, is made of timbers as thick as the stern post, up and down which it extends, and to which it is suspended by pintals or eyes upon the edge of the rudder, that catch upon the hinges or gudgeons set in the stern post. The head of the rudder passes up through the stern above the deck, and to this a handle called a tiller is fastened for turning the rudder. When the ship is in motion, the rudder being partly turned to one side is struck by the water, causing the stern to be pushed off, the effect of which is to turn the head of the vessel in the contrary direction. When hung before launching, the precaution is taken to fasten the rudder securely, so that it cannot be moved.—The ship itself being now made ready for the launch, two parallel lines of heavy timbers are laid at a suitable distance apart, according to the size of the ship, along her length, one on each side, and continued down into the water till sufficient depth is reached for the vessel to float. The fall of the water at low tide affords the opportunity for doing this. The slope of this track, or of the "ways," is about  $\frac{1}{4}$  of an inch to the foot for large vessels; small vessels require a little more inclination. The timbers are held together by others underneath crossing them, and the frame is kept down by being

loaded with stones; this at least is the practice where the sliding ways are not permanent structures. The top of each timber is well covered with melted tallow, and upon this when cold is added soft soap or oil. On the top along the outer edge a ribbon of hard wood full 5 inches square is fastened down, and braced by a succession of shores extending back on each side against some solid support in the ground; the object of this ribbon is to prevent any outward deviation of the upper timbers that make the cradle in which the ship is held as the whole slides down together. This second system is loosely piled up under the ship, the lowest portion being timbers smooth and well greased on the under side and laid directly on the ways. Between these timbers, called the bilgeways, and the bottom of the ship over them, the space is filled in partly with blocks of timber and planks, and toward the bow and stern by short shores, called poppets, set up from the bilgeways to the bottom of the ship, their steadiness being secured by stout planks temporarily fastened along the bottom against the heads of the poppets. Against the stem and stern chains are passed across to hold the cradle together, and it is also kept from spreading by wooden ties laid across and furnished with mouldings that fit over the ways. To the front of the timbers of the cradle are fastened ropes that are passed over the bow into the ship, and are intended to hold these when they float away from under the vessel. To bring the weight of the ship upon the cradle after this is fitted under it, long wedges are driven in over the bilgeways from both sides of each of them. The shores at the sides of the ship, which had heretofore aided to sustain her, and the blocks beneath the keel, which took the chief portion of the weight, may now be removed, with the exception of a few of the latter under the forward part of the vessel. All this preparatory work is done on the rise of the tide; and when this is at about its height, and two short shores, called dog shores, have been placed, one on each side the vessel, to brace from the ways as a fixed point forward against the bilgeways, and thus hold the cradle with its load from sliding too soon, the fore blocks are split up with wedges and drawn out, letting the whole weight settle down on the ways. At an order the dog shores are knocked down, and the structure begins to move, at first slowly and then with rapidly increasing velocity. In rivers and contracted places the course of the vessel is checked by a hawser made fast on shore, one end of which is carried on board, or she is brought up by letting go an anchor. The French have long practised launching vessels without side ways, the weight being entirely supported upon a sliding plank fitted under the keel. A strip of timber is fastened along under the bilge on each side, and a few timbers are laid up in the usual place of the ways, reaching within about half an inch of these strips. It is not expected that they

will come in contact except in case of the vessel heeling, when they will serve to prevent her falling over. After the launch the vessel is conducted to the wharf to receive her spars, rigging, and machinery, if a steam vessel, and interior finish; or she may be taken into the dry dock to be sheathed. This operation cannot be so well done upon the stocks, and the sheathing moreover would be in danger of injury from the necessary spiking of planks and cleats to the bottom in launching. It is important to protect the bottom of vessels with a metallic covering, as without this it soon collects an incrustation of marine vegetable and animal bodies, which seriously interferes with their progress through the water, and the timbers are liable to be attacked by the ship worm. Sheet lead was used in ancient times, and sheet copper was first applied to the ships of the royal navy in 1788. This is liable to corrode, more rapidly in some waters than in others, and the oxide formed is fatal to the shell fish that usually collect on the bottom; for it is found that if this change is checked, as was proposed by Sir H. Davy, by placing small pieces of zinc or iron in contact with the copper, the latter, though protected from corrosion, is very soon incrustated with shells; hence the copper is allowed to waste. The great expense incurred in suits of copper, which need frequent replacing, is much reduced by the use of the so called yellow metal, a combination of copper and zinc described in the article BRASS. The metallic sheets are used of different thicknesses for surfaces more or less exposed, the weights being 32, 28, 18, and 16 oz. to the square foot. The thickest sheets are used for the bow and about the load water line. The size of the sheets is 4 feet by 14 inches; and a 120-gun ship would require of them 4,444. They are fastened with copper nails, and are laid so that each sheet laps upon the edge of the next one to it behind and below.—*Masts and Rigging.* The spars of a vessel include the masts, yards, booms, gaffs, and smaller sticks used to support the rigging and sails. The masts of the smaller vessels are single sticks of pine timber well rounded and with a gentle taper. For large ships it is necessary, on account of the size of the masts, to construct them of a central stick of a number of sides, with longitudinal pieces closely fitted and securely attached to them and then hooped with iron; these are called made masts, and are stronger than the single sticks of the same size. Hollow masts of plate iron are in use, particularly for iron steamships. Rules for the length of the mainmast of a ship have been half the sum of the length of the load water line and of the main breadth of the vessel, and also twice the breadth added to the depth. About the head of each of the lower masts are framed timbers making a horizontal scaffolding or platform, which is known as the top. On large ships it is railed around, and on vessels of war it used

to be the custom to station men in it during an engagement armed with muskets. Upon the rounded front edge of the top stands the topmast, secured in part by passing above through a strong iron-bound flat block set horizontally upon the upper extremity of the lower mast and called a cap. The topmast is about  $\frac{3}{4}$  the length of the lower mast; and above it succeed in like manner the topgallant mast and royal mast; and in seas where the prevailing winds are light and are felt more aloft, still another mast is added, called the skysail mast. At the head of the upper masts are cross trees in place of the top on the lower mast. Each of these masts carries its own yard, from which depends the square sail designated by the same name as the mast to which it belongs. Its lower corners are sheeted out to the extremities of the yard below, or, in case of the courses or lower sails, to the deck. The yards slide up and down their masts, the lower yards hanging in slings called jeers by their middle part, and most of them by lifts attached to the yard arms, and passing thence through a block at the head of the mast. The foremast is about  $\frac{1}{10}$  shorter than the mainmast, and is furnished with similar yards, rigging, and sails; those of the two masts are distinguished by the terms main and fore respectively applied to them. The mizzen mast of a ship carries no square sail hanging from the mizzen yard, but a mizzen topsail, topgallant sail, and royal. In place of the lower square sail is a fore-and-aft sail called a spanker or gaff sail, which extends aft from the mast over the taffrail, and is sheeted out to the end of a gaff above and to that of a boom below. This is of great service as a steering sail, acting as it pushes the stern off from the wind to bring the bow up as it is hauled in and kept flat. A similar sail is sometimes attached to each of the other masts and used for storm sails. The masts are held down by shrouds and stays. The former are strong ropes, each one  $2\frac{1}{2}$  as long as the mast, the head of which it encircles by its middle part. A number of these pairs are thus secured over the head of the mast, and the ends are brought down over the side, diverging as they descend. They terminate outside the ship in blocks called dead eyes, which connect by a tackle to others fastened on the outer edge of the channels or chainwales, which are heavy plankings secured edgewise to the side of the vessel below the bulwarks. This edge is held down by iron braces bolted below to the futtocks. Though the main object of the shrouds is to hold the masts steady, they also serve as ladders, small ropes called ratlines being tied across from one to another for steps. The topmast shrouds are set up by dead eyes secured to the outer edge of the top, and this edge is braced down by short ropes called futtock shrouds attached below to the upper part of the lower mast. The futtock shrouds and those of the topmast have ratlines also, but those for the masts still higher are

frequently only two ropes set up to the cross trees. The stays are ropes which act as ties to hold down the several masts, starting generally from their heads, and secured to the foot of the next mast in front, those for the foremast to the bowsprit. The back stays pass from the heads of the topmasts directly down to the chain wales, somewhat aft of the foot of the mast to which they belong. The stays that pass from the several masts forward sometimes support triangular fore-and-aft sails, called stay sails or storm sails, from their use as the only sails sometimes set for lying to in heavy gales. The main and mizzen masts stand nearest together, the former somewhat aft of the centre, and both of them usually are set raking or inclining aft. The foremast stands well forward and upright. The bowsprit extends forward over the bow, rising at an angle of  $80^{\circ}$  to  $88^{\circ}$ , its heel resting in a step on the first deck below close to the foremast. A cap is fixed upon the head of it, presenting a round hole above the bowsprit, through which is passed the spar called the jib boom, which is the extension of the bowsprit. As the foremast is stayed forward to the bowsprit, and several fore-and-aft sails, called the fore stay sail, jib, and flying jib, are supported on the stays between them, it is essential that the bowsprit itself be well secured. This is done first by the bobstay, a very strong rope, sometimes double and triple, which connects the outer portion of the bowsprit with the stem; and by the bowsprit shrouds, which are ropes extending from the end of the bowsprit and of the jib boom to the bows. The martingale is a stiff brace or strut extending down from the end of the bowsprit to tighten the head stays, that reach from the stem to the extreme end of the jib boom. A yard sometimes hangs under and across the end of the bowsprit, called the spritsail yard, supporting a square sail called the spritsail. The sails over the bowsprit are of triangular shape. They are run up the stays by halyards and drawn down by the downhaul. The rope by which their lower corners are made fast to the deck is called the sheet; this is also the name of the ropes by which the lower corners of the square sails are hauled out to the ends of the yards. Of the courses or lower square sails the corners on the lee side, which in sailing on a wind are hauled aft, are secured by sheets; but the corners on the windward side, which are hauled forward, are made fast to the deck by ropes called tacks. It is with reference to tending these, to shift them as the yard swings in going about, that the preparatory order is given of "Tacks and sheets," succeeded, as the evolution is completed, by "Let go and haul." The braces are the ropes by which the yards are swung round. The sail is made to lie still flatter by bowlines which are attached to the leach or edge of the square sails and pass forward. In sailing as close to the wind as possible, the weather bowline is hauled taut, whence the expression "to sail on a bowline,"

or "on a taut bowline," for lying up close to the wind. In running large or full before the wind the yards are set at right angles to the line of the keel. The head sails are partially becalmed by the after ones, and the fore-and-aft sails over the bowsprits are of no service; the progress of the ship therefore is not so rapid as with the same wind on the quarter or abeam and filling all the sails. In order to spread a greater surface of canvas when the winds are light and fair, provision is made for lengthening the yardarms by means of booms called studdingsail booms, which are run out through an iron ring on the end of the yard, and from which are suspended the studdingsails. With a side wind these sails are advantageously carried on the weather side. The assemblage of ropes upon a ship, many of which have already been named, are known as the rigging. Those which are fixed, as the shrouds, stays, &c., are called the standing rigging; and the rest, as the halyards, sheets, and tacks, are the running rigging. Sails are further described in the article *SAIL*.—

*Working the Ship.* The manner in which a ship works at sea depends in great part upon the load she carries, and where it is placed. With but little weight she is uncomfortably tossed about, and is drifted off to leeward when sailing on the wind. With sufficient ballast, this may be placed so low that the ship is badly balanced and rolls violently, or it may be too near the ends, causing her to pitch heavily. A fair distribution of the cargo is important, and the placing of all the heavier articles near the bottom only when they can be partially counterbalanced by other freight in the upper portions. Particular reference should be given to the trim of the ship, or her proper proportionate draught forward and aft, as determined by experience. Many fast vessels are sailed at slow rates through neglect of this precaution. It is stated that the finely modelled old ships of the Spaniards when captured by the English never sailed remarkably well, for the reason that the English did not understand their proper trim, and invariably loaded them so heavily forward as to make their draught equal at the bow and stern, when they should have set deeper aft. The principle upon which a vessel is made to advance against the wind may be explained as follows: Sustained in a state of equilibrium in the water by the equal pressure of this fluid around the hull, she is readily susceptible to any force applied to change her position. This involves a movement of the water to admit her passage through it. On the line of the keel this easily takes place from the wedge-like shape of the hull fitted to cleave the water; but a movement sidewise is resisted by the great body of water pressing against the hull for its full length. Whenever therefore the sails are filled by a breeze blowing against them from behind, even if at a considerable angle with the length of the ship, it is easy to perceive that her motion

must be forward on the line of the keel. As the wind draws further forward the sails are braced further round, so that they may still receive it upon their after side. The wind of course strikes them to a greater disadvantage the nearer their plane approaches its direction; but so long as it impinges even obliquely upon their after surface, a portion of the force is exerted to press out the sails in a forward direction, while the remainder passes uselessly along the plane of the sails. The former portion tends to push the ship directly in a course at right angles with this plane; but the shape of the ship being opposed to this movement, this force also is resolved into two, one acting to propel the ship sidewise and the other forward. Thus this last result may prove effective even when the head of the ship is pointed obliquely toward the wind, as mentioned of the clipper ships, at an angle of  $40^{\circ}$  or  $45^{\circ}$ , and in the case of ordinary sailing frigates at an angle of  $60^{\circ}$ . Though, when sailing thus partially toward the wind, but a small portion of its propelling effect is available, something is recovered by its greater force caused by running against it; while in sailing in the opposite direction its effect is diminished by running away from it. If, after sailing for any time with the sails sharply braced, the head of the vessel can be brought round, so that the sails shall fill on the other side, the ship will proceed on the other tack on a line reaching further and further to the windward of that before passed over, and thus by a succession of zigzags progress is continually made against the course of the wind. This is called beating to windward, and the turning of the ship toward the wind and thence around is tacking. This is done as follows: The helmsman, having carefully kept the head of the ship as near the wind as practicable with the sails remaining full, at the order puts the helm gradually down, and soon after, at another order, "hard a-lee." As the head of the vessel is thus brought up toward the wind, the head fore-and-aft sails are let fly by casting off their sheets, so that they shall present the least impediment in the way of this movement. The spanker on the contrary is hauled more toward the centre, that the wind continuing to strike it may push the stern round the other way. Soon the square sails on the foremast catch aback, or receive the wind on their forward side. This, while it checks the headway, also tends to throw the bow still further round. The after yards are then swung for the wind to strike them on the other side, and the same is next done to the head yards. As the sails fill, the ship soon gathers headway on the new tack. Fore-and-aft rigged vessels are much better adapted for working to windward than those with square sails. Their sails keep full at a smaller angle with the wind, and in going about or tacking they do not lose headway, but even run some distance directly in the eye of the wind, which other vessels are prevented from doing by their great square sails filling

aback. As a storm comes up at sea, the first precaution is to shorten sail. The lighter sails are taken in and furled, and the topsails are first single-reefed, and next double-reefed; mainsail is reefed; mizzen topsail close-reefed; next the fore and main topsail the same; mainsail is then furled and the jib also. The foresail is then reefed and the mizzen topsail is furled. The main spencer may now be set, and the fore topsail furled unless the ship is too stiff. With close-reefed main topsail and reefed foresail, with the main spencer and stay sails, the ship is now under good sail for either running or lying to. With increasing wind and the ship lying to, the foresail may be taken in, and the sail be still further reduced to goose-winging the main topsail, which is hauling up the weather clew and stopping the sail down to the yard, leaving only the portion on the lee side exposed. When this is taken in, the last resort is setting tarpaulin in the weather mizzen rigging of the ship. The practice is somewhat varied with different ships according to their manner of working. In case the vessel does not lie to well, she may in a favorable lull of the storm be put before the wind, and run off under bare poles. With such resources, ships at sea in good trim with plenty of room usually escape in the severest storms, sometimes indeed with the sails more or less torn, the topmasts carried away, and occasionally with a mizzen mast cut away to ease the vessel, or otherwise dismasted. The great danger is in proximity to land, especially when it is a lee shore.

SHIP WORM, or PILE WORM, the popular name of the bivalve shells of the family *pholidos* and genus *teredo* (Linn.), so called from their perforating ship and other timber. The shell is thick, short, globular, equal-valved, widely open in front and behind, lodged at the larger or inner extremity of a cylindrical tube, straight or sinuous, partly or entirely lined with white calcareous matter, and often open at both ends. The valves are reduced to mere appendages of the foot; in the centre of their circular opening this organ is protruded, the whole forming a very effectual boring apparatus, which is indicated by their peculiar shape, strength, arrangement of the valvular ridges, and great size of the adductor muscle. The animal is elongated and worm-like, the length being due chiefly to the prolongation backward of each respiratory tube, the siphons of which are provided with 2 calcareous triangular flattened plates, the *palettes*, which are always turned to the external aperture. The best known species is the *teredo navalis* (Linn.), whose calcareous tubes are from 1 to 2½ feet long. They attack wood immersed in sea water, whether of ships, piles, or piers, boring in the direction of the grain, and turning out only for a hard knot, or a companion whose presence they detect by the sense of hearing; the dust of the rasped wood is introduced by the foot into the cavity of the mantle and

swallowed, and is usually found filling the long intestine. They are ovoviviparous, and the young after leaving the body of the mother have a smooth bivalve shell, swim by means of long vibratile cilia, and creep by the tongue-shaped foot; they soon attach themselves to wood and begin to bore, secreting the calcareous tube as they go along; they grow in the wood and enter it when young, as is evident from the external aperture being too small to admit the body of the enclosed adults. From the tropical seas they have been introduced into the temperate waters of Europe and America, and in many places have been exceedingly destructive; in 1731-'2 great alarm was felt in Holland lest the dikes should be destroyed by their borings in the supporting piles, and this danger has threatened more than once; piles that had been driven only 6 or 7 weeks on the coast of Holland have been found eaten through and through; many a stout ship, especially in the tropics, has been destroyed by these small bivalves. During the great inundation in Holland in Feb. 1861, in which villages were entirely destroyed, nearly 40,000 acres of cultivated land submerged, and many lives lost, the dike of Leeuwarden was broken through, giving free entrance to the waters; from past experience, there can be little doubt that the attacks of the *teredo* had so weakened the piles as to invite the break at this place. The best protection has been found to be metal sheathing and broad-headed nails, and in some cases kyanizing or otherwise poisoning the timber has prevented their attacks. Other species have been found whose tubes extend for 3 to 6 feet, with walls of ¼ to ½ inch thick, and sometimes diverging into 2; one burrows in the husks of cocoanuts and other woody tropical fruits floating on the ocean, making very crooked channels. For details see the abstract of a paper read before the national institute at Washington, D. C., by James Jarvis, Esq., giving the results of his experiments since 1849 on various kinds of timber, in the "Annual of Scientific Discovery" for 1857, p. 359.—Another pile or timber worm, which will be best mentioned in this article, is a minute sessile-eyed crustacean, of the order *isopoda*, and genus *limnoria* (Leach). The best known species is the *L. terebrans* (Leach), ½ to ¾ of an inch long, rounded at each end, with sides parallel; there are 14 segments, the last 2 much the largest, the 7 next to the head each bearing a pair of short legs; there are 2 pairs of jaws and a pair of strong mandibles, which are the boring organs; the general color is olive-gray. It can swim as well as creep, and when touched rolls itself into a ball by bending down the head and tail in the manner of the common sow bug, which it much resembles. It was discovered by the late Robert Stevenson, the architect of the Bell Rock lighthouse, in 1803, and was named and described by Dr. Leach in 1811. It is gregarious, and abundant in some places; it attacks by preference soft woods, like the

pine family, though it will perforate all the hard woods, as far as known, except the teak and others of similar density; all wooden structures immersed in salt water are attacked by it, especially sea bulwarks, and the piles and piers of bridges, docks, and canals; it rarely perforates floating wood, unless it be confined in timber docks. The perforations are generally for a few feet below low water mark, and in preference in the direction of the grain between the annual rings; and their numbers are so great that by the time one has perforated an inch the timber is riddled. They are common on both sides of the Atlantic, and are everywhere destructive. They may be guarded against in the same manner as the *teredo*. These destructive creatures have also their uses in disintegrating sunken vessels and wooden substances which would otherwise obstruct important navigable channels, and require great labor and expense to remove. Other mollusks which bore into the hardest substances, as *pholas*, *lithodomus*, *clavagella*, *aspergillum*, *saxicava*, &c., will be noticed under **STONE BORERS**.

**SHIPPING.** The law of shipping, the law of marine insurance, and the law of negotiable paper have a common origin in the custom of merchants. This custom and its authority ascend to a remote antiquity, and the books to which we must refer for it give us the rules not of one people or country alone, within two or three centuries only, but of the commercial world during many ages. Thus we find that many of the present rules and principles of the law of shipping, some even of those which might seem to be most peculiar, have an earlier origin than any thing in the common law, or indeed in any existing system of law. Even the Roman law, in the rubric *de lege Rhodia de jactu* (concerning jettison), quotes and confirms the law of Rhodes, whose commerce flourished at least 1,000 years before the Christian era. In the fragment to which we have alluded, the modern law of jettison, average, and contribution is as distinctly stated as in any recent text book; and in the title *de nautico fenore*, which, however, like many other rubrics of the *Corpus Juris* relating to shipping, is not traceable to any earlier source than the law of Rome, we have the present rules regulating loans on bottomry and respondentia. Passing over several centuries, we find other still ancient but useful repositories of the customs of merchants and of the maritime law in the *Consolato del mare*, a collection or digest of the principal rules and usages established among commercial nations from the 12th to the 14th century, and in the laws of Oléron and the laws of Wisby, codes of maritime usages promulgated about the 12th or 13th century. Later, *Le guidon*, a book of the 16th century; the *Ordonnance de la marine* of Louis XIV., published in 1681, a work of the highest excellence covering the whole ground of maritime law; Valin's commentaries upon the ordinance; Cleirac's *Us et coutumes de la mer*;

and the writings of Roccus and Casaregis, Italian juriconsults of the 17th and 18th centuries, reflect the commercial usages of their respective periods, and are the abundant, authoritative, and often sought sources of the modern law of shipping.—A ship is personal property, a chattel; and unless some positive law interposes, it may be transferred from seller to buyer by the same forms that attend the transfer of chattels of any other description; and in fact it can hardly admit of a doubt that an oral contract suffices to pass the property in a ship, and that no written evidence of the sale is essential to its validity. Still it is the ancient usage of the maritime law to make a bill of sale or other written instrument the almost inseparable accompaniment and evidence of the sale, and it is convenient and proper that it should continue to be so. But apart from expediency and established usage, written evidence of the sale of a ship is made an essential condition of registration under the laws of the United States, the act of 1792 providing that in every case of sale or transfer there shall be some instrument in writing in the nature of a bill of sale, which shall recite at length the former certificate of registry; otherwise the ship shall be incapable of being registered anew. Though the statute does not prevent the property from vesting in a purchaser under a merely oral contract, yet it renders a bill of sale a practically indispensable formality, because registration, of which it is the condition, gives to the ship all its substantial value as an instrument of commerce.—The laws which regulate commerce confer exclusive privileges in the carrying and coasting trade on United States ships. No merchandise may be brought from any foreign country to this except in American vessels, or in vessels belonging to that country of which the merchandise is the product; and no merchandise shall be carried from port to port in the United States by any foreign vessel unless it formed a part of her original cargo. Ships intended for the fishing or coasting trade must, if not registered, be enrolled and licensed. In short, a ship that is neither registered nor enrolled and licensed cannot sail on any voyage with the privilege or protection of a national character or national papers. This national character and the benefit of it can be acquired only by compliance with the registry laws. The ships which may be registered under these laws are those built within the United States and owned wholly by citizens thereof, and those captured and condemned as prizes or adjudged forfeited by violation of law, if owned wholly by citizens of this country. No ship can be registered if an owner or part owner usually resides abroad, although a citizen, unless he be a consul of the United States or an agent for and a partner in a mercantile house established and doing business here; nor if the master be not a citizen of the United States; nor if the owner or a part owner be a naturalized citizen and



reside in the country whence he came more than a year, or in any foreign country more than two years, unless he be a consul or public agent of the United States. If a registered American ship be sold or transferred in whole or in part to an alien, the certificate of registry must be delivered up, or the vessel is forfeited. As soon as a registered vessel arrives from a foreign port, her documents must be deposited with the collector of the port of arrival, and the owner, or, if he does not reside in the district, the master must make oath that the register contains the names of all persons who are at that time owners of the ship, and at the same time report any transfer of the ship or of any part that has been made within his knowledge since the registry, and also declare that no foreigner has any interest in the ship. If a ship be transferred while at sea or abroad, the old register must be given up, and all the requirements of law as to registry must be complied with within 3 days after her arrival at the home port.—The rights of part owners of ships form an important branch of the law of shipping. Two or more persons may become part owners in either of three ways. They may build a ship together, or join in purchasing it, or each may purchase his share independently of the others; and their rights and obligations are the same in all these cases. If the register or instrument of transfer do not designate specific and unequal proportions, part owners will be presumed to own in equal shares. A ship may form part of the stock or capital of a co-partnership, and then it will be governed in all respects by the law of partnership. But part owners are not necessarily partners. Any one of them may at any time sell his share to whom he will, but he cannot sell the share of any other part owner without his authority. A majority of the owners may generally direct the employment of the ship at their discretion; but a court of admiralty will interfere to do justice between them, and prevent any one from inflicting injury on the others. In the absence of the rest, and without prohibition from them, one part owner may, in the exercise of good faith and a sound discretion, manage the ship as for himself and them; and the contracts into which he enters in relation to the employment or preservation of the ship bind all the part owners in favor of an innocent third party. In general, all the part owners are liable *in solido*, or each one for the whole amount, for all the repairs of a ship or for necessities actually supplied to her in good faith; but if it can be clearly shown that especial credit was given and intended to be given to one owner personally to the exclusion of the others, the others cannot be holden. Charging the goods to the ship by her name, or to the "ship — and owners," would tend strongly to show that the goods were supplied on the credit of all; but charging them to some one owner alone would at least raise the assumption that the credit was intentionally given to him

alone. One of the part owners generally acts as ship's husband. His ordinary duty and authority include equipping and repairing the ship, taking care of her while in port, furnishing her with all regular and proper papers, and making contracts for freight or passage. He cannot unless specially empowered make insurance, buy a cargo, borrow money, or surrender the owners' lien on the cargo for freight. It is not absolutely established whether or not a part owner has a lien on the shares of other part owners, or on the whole vessel, for advances or balances due him on account of the vessel. The general course of adjudication seems to be adverse to this claim; yet there is some authority the other way, and in the United States, and particularly in New York, an evident disposition to favor the lien.—The owner of a ship may employ it in carrying his own goods or those of another. He may carry the goods of others while he himself retains the possession and direction of the ship, or he may lease it to others. In the one case, he carries goods on freight; in the other, he lets his ship by charter party. When goods are carried on freight, the rights and obligations of ship owner and shipper are stated generally in an instrument of which the origin is lost in antiquity, and which is now in universal use among commercial nations with but little variety of form. It is called the bill of lading. It should contain the names of the consignor and consignee of the vessel, of the master, of the places of departure and destination; also the price to be paid as freight, with *primage* and other charges if any there be; and either in the body of the bill or in the margin the marks and numbers of the things shipped. The bill should be signed by the master of the ship, who by the strict maritime law has no authority to sign a bill of lading until the goods are actually on board. One copy of the bill of lading is usually retained by the master, and three copies are given to the consignor; of these he retains one, and the others he sends to the consignee, one of them with the goods and the other by some other conveyance. The bill promises delivery to the consignee or his assigns. The consignee may designate his assigns by a particular indorsement, or he may indorse the bill in blank. As the bill is evidence against the ship owner as to the reception of the goods, and their quantity and quality, it is common to say: "Contents unknown." Yet between the ship owner and the shipper the bill is not conclusive, and the former may show that the goods were injured or destroyed on the passage by reason of some intrinsic defect, which was not apparent or easily to be ascertained when the goods were shipped. If however the bill has altered the situation of parties relying on its truth, so that either an innocent party must suffer or else the ship owner whose agent signed the bill either fraudulently or heedlessly, it is he and not the innocent party who must bear the loss.—The

contract of affreightment is entire; therefore no freight is earned unless the whole is earned by carrying the goods quite to their destination. If the transportation is incomplete, having been interrupted by wreck or other cause, there is no absolute right of freight. Yet there is a conditional right; for as soon as the ship receives the goods, it not only comes under the obligation of carrying them to their destination, but at the same time, or perhaps more exactly, on breaking ground and beginning the voyage, acquires the right of so carrying them. Therefore, if any interruption intervene, the ship owner has the right of transshipping the goods and carrying them on to their original destination. When they arrive there, he may claim the freight money originally agreed upon, but no more, whatever extra cost he may have incurred. If the shipper please, at any intermediate port of the voyage, to tender the full freight, the ship must of course deliver up the goods. When the ship master certainly will not or certainly cannot carry or send the goods forward, the strict rule of law is, that the shipper is entitled to them without any payment of freight. So the shipper may always refuse to receive them, and then under no circumstances is freight payable, on the ground that the original contract is at an end, and no new one has been substituted, either expressly or tacitly, or by implication of law. But when the master can do no more with the goods, and offers their delivery in good faith, the shipper ought not to refuse unreasonably to receive them. If they are formally tendered on the one side and formally accepted on the other, the original contract is held to be severed, and now freight *pro rata* is due; and however they may come into possession of the shipper, if their original value has been increased by the partial transportation, the courts are disposed to give the ship owner a proportionate share of the freight. The goods are to be delivered by the bill of lading in good condition excepting "the dangers of the seas," and such other risks or perils as may be expressed. Damage caused to goods by an excepted risk is therefore the loss of the shipper or consignor, and not the loss of the owner. But if goods are lost in substance, even if not in form, as if sugar is washed out of boxes or hogsheads, or wine leaks out of casks by reason of injury sustained from a peril of the sea, though the master may deliver the hogsheads or casks, this is not a delivery of the sugar or of the wine, and no freight is due. But freight must be paid if the goods are injured or actually perish and disappear from any internal defect or decay or change; that is, from causes inherent in the goods themselves. If goods are delivered, although damaged and deteriorated from faults for which the ship owner is responsible, as bad stowage, deviation, negligent navigation, or the like, freight is due, the amount of the damage being first deducted. The rules in respect to passage money are quite analogous to those which reg-

ulate the payment of freight; but as the money is not earned except by carrying the passenger, or *pro rata* by carrying him a part of the way with his consent, it may be recovered back when it has been paid, as it usually is, in advance, and not earned.—It is an ancient principle of the maritime law that ship and cargo have reciprocal duties or obligations, and are mutually pledged for the performance of these duties. In other words, not only is the owner of the ship bound to the owner of the cargo, as soon as he receives it, to lade it properly, to take care of it while on board, to carry it safely, so far as the seaworthiness of the ship is concerned, to its destined port, and then deliver it all in a proper way, but the ship itself is bound to the discharge of these duties. That is to say, if, by reason of a failure in any of these particulars, the shipper of the goods is damaged, he may indeed look to the ship owner for indemnity, but he is not obliged to do so, because he may proceed by proper process against the ship itself. On the other hand, if the ship discharges all its duties, the owner may look to the shipper for payment of his freight, or he may keep his hold on the goods, and refuse to deliver them until the freight money is paid.—An owner, we have said, may let his ship to others. The instrument which contains the evidence of such a contract is called a charter party, an ancient name, the origin of which is not quite certain. The form of the instrument varies of course with the bargain between the parties. Generally only the burden of the ship is let, the owner holding possession of her, finding and paying master and crew, supplies and repairs, and navigating her as is agreed upon. Sometimes, however, the owner lets his ship as he might let a house, and the hirer takes possession, mans, navigates, supplies, and even repairs her. The charter party should designate particularly the ship and master and the parties; should describe the ship generally and particularly as to her tonnage and capacity; should designate especially what parts of the ship are let, and what parts if any are reserved to the owner or to the master to carry goods, or for the purpose of navigation; should describe the voyage or the period of time for which the ship is hired with proper particularity; and should set forth the lay days, the demurrage, the obligations upon either party in respect to the navigation or furnishing of the ship, and all the other particulars of the bargain; for as it is a written instrument, the charter party cannot be varied by external evidence. Lay days are those which are allowed the charterer for loading or unloading the vessel. They are counted from the arrival of the ship at her dock, wharf, or other place of discharge, and not from her arrival at her port of destination, unless otherwise agreed. In the absence of any custom or bargain to the contrary, Sundays are computed in the calculation of lay days at the port of discharge; but if the contract specifies "working lay days,"

Sundays and holidays are excluded. If more time than these agreed lay days is occupied, it must be paid for, and the amount thus paid is called demurrage. By the charter party the hirer (or charterer) usually agrees to pay so much demurrage a day. If time be occupied in repairs of the ship which are made necessary without the fault of the owner or master or of the ship itself, that is, if they do not arise from her original unseaworthiness, the charterer pays during this time. But generally speaking, there is no claim for demurrage on the charterer for any delay which is induced by the action of the elements, as ice, tide, or tempest, or from any act of government, or from any real disability of the consignee which could not be imputed to his own act, or to his own wrongful neglect. The contract of charter party may be dissolved by the parties by mutual consent, or without their consent by any circumstance which renders the contract illegal; as for example, a declaration of war, an embargo, or a blockade.—In the navigation of the ship, the whole care and supreme command are intrusted to the master. He must see to every thing that respects her condition, including her repairs, supplies, loading, and unloading. He is principally the agent of the owner, but is to a certain extent the agent of the shipper and of the insurer, and of all who are interested in the property under his charge. Much of his authority as agent of the owner springs from necessity. In a case of extreme necessity, he may even sell the ship; he may pledge her for a debt by a bottomry bond; he may charter her for a voyage or a term of time; and may raise money for repairs or incur a debt therefor, and make his owners liable. The necessity which creates the authority for these acts must be greater in some cases than in others. Thus a sale is justified only when the necessity is extreme and urgent, and when such a course seems to be the only one for preserving to the owners or insurers any part of the ship's value. The necessity which authorizes a pledge by bottomry may be far less in degree. Chartering the ship is warranted by a considerable mercantile expediency, while to bind the owners for the expense of repairs and supplies it is sufficient if they were such as the condition of the vessel and the safe and comfortable prosecution of the voyage render proper. Generally the master has nothing to do with the cargo between the lading and the delivery; but if the necessity arises, he may sell the cargo or a part of it at an intermediate port if he cannot carry it or transmit it, and it must perish before he can receive specific orders. So he may sell it or a part of it, or pledge it by means of a respondentia bond, in order to raise money for the common benefit. A bond of respondentia is much the same thing as to the cargo that bottomry is as to the ship. It secures money borrowed at maritime interest and on maritime risk by pledge of the goods, and the debt is discharged when the goods perish. The owner is liable

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for the master's wrong doings; that is, for every injury done by the master while acting in that capacity. For example, if, from want of skill or care while navigating the ship, he runs another down, the owner is liable for the collision; but not if the master when on shore or even on his own deck quarrels with a man and beats him.—Under our pilotage laws, every ship entering or leaving a harbor must, within certain limits, accept the services of a pilot if they are offered, or pay the prescribed fees even if those services are declined; and if a ship neglect to take a pilot when it should and can do so, the owners will be answerable in damages to shippers or others for any loss which may be caused by such neglect or refusal. As soon as the pilot stands on deck he has control of the ship, and is answerable for any damage resulting from his own negligence or default. Yet it remains the master's duty and power, in case of obvious and certain disability, or dangerous ignorance or error, to disobey the pilot and dispossess him of his authority.—See also AVERAGE, BOTTOMRY, SALVAGE, SEAMAN, and STOPPAGE IN TRANSIT.

SHIRAZ, a city of Persia, capital of the province of Fars, and formerly of the kingdom, situated on a beautiful elevated plain, 115 m. E. N. E. from Bushire; pop. estimated at 80,000. It is enclosed by walls nearly 4 m. in circumference. Shiraz formerly contained many mosques and other handsome buildings, but the town was almost totally destroyed and 12,000 people killed by an earthquake in 1853. There had also been severe earthquakes in 1812 and 1824. It stands on the road leading from Bushire to Isfahan, and has a very considerable trade, though during the present century it has greatly declined. Its lapidaries are said to be the best in Persia. There are some manufactures of silk and cotton goods, cutlery, firearms, glass, &c. Shiraz was the birthplace of the poet Saadi, who is buried in the neighborhood, and of Hafiz. It is a very ancient place, having been founded in 697; there are remains of antiquity in the vicinity, among others the ruins of Persepolis.

SHIRE. See COUNTRY.

SHIRE, a river of E. Africa, one of the largest affluents of the Zambesi, and one of the outlets of Lake Nyassa in lat. 14° 23' S. It has a southerly course of about 350 m., and discharges its waters into the Zambesi about 80 m. above the apex of the delta. It is navigable throughout its course except about 33 m. of rapids, and at the point where it issues from the lake is nearly 150 yards wide and 12 to 15 feet deep; at its entrance into the Zambesi it is a mile in width. The country through which it flows is salubrious and well adapted to the culture of cotton and grain.

SHIRLEY, JAMES, an English dramatist, born in London, Sept. 13, 1596, died Oct. 29, 1666. He was graduated at Catharine hall, Cambridge, entered holy orders, and was appointed to a living near St. Albans, Hertfordshire, which he soon after resigned in conse-

quence of having become a Roman Catholic. After a few years of drudgery as teacher in the grammar school of St. Albans, he settled about 1625 in London and became a writer for the stage. He had produced altogether 83 plays, when parliament in 1642 prohibited the performance of stage plays throughout the kingdom. He fought in the civil wars under the earl of Newcastle, and afterward returned to his old occupation of teaching. The great fire of London drove him and his wife from their house in Fleet street into the suburbs, where, overcome by fright and fatigue, they both died on the same day and were buried in the same grave. Shirley's plays are no longer acted, with the exception of the "Traitor," partly recast by Sheil and produced at Covent Garden theatre in 1819, under the title of "Evadne, or the Statue." The only collection of his dramatic and poetical works is that of Gifford and Dyce (6 vols. 8vo., London, 1833).

SHOA, a kingdom of N. E. Africa, in Abyssinia, between lat.  $8^{\circ} 30'$  and  $11^{\circ} N.$ , and long.  $38^{\circ}$  and  $40^{\circ} 30' E.$ ; pop. estimated at 2,500,000, of whom about 1,000,000, in Shoa proper and Efat, are Christians of the Coptic church, and the remainder Mohammedans in the eastern and pagans in the southern dependencies. Capital, Ankober. The limits of the kingdom are not very well defined, and are being extended as opportunity offers. The Adal desert bounds it to the E., the river Hawash to the S., the Abai to the W., and the country occupied by the tribes of the Mohammedan Gallas to the N. Shoa consists of a series of plateaux varying from 2,000 to 10,000 feet in height above the level of the sea. The E. part of the kingdom is called Efat, and the descent toward the Adal desert is rapid. The S. part terminates in a broad plain; and in the W. and centre is the valley of the Jamma, about 3,000 feet above the sea, with high mountains rising from its surface both N. and S. Shoa is watered by numerous streams; the soil is fertile, and large crops of grain are raised. It is said that there are 24 species of wheat in the kingdom. The higher lands are used chiefly for pasturage. The valleys are very beautiful and well wooded, but in summer they are hot and unhealthy, and particularly subject to fever. They produce coffee, cotton, drugs, and different sorts of dye woods. Iron ore, sulphur, and coal are abundant, but the inhabitants have not yet learned to turn the last named to account. Shoa has but little external trade, and its foreign commerce is carried on principally through the ports on the coast of the sea of Bab-el-Mandeb. These ports are from 150 to 300 m. distant, and the difficulty of transporting goods across the desert is very great. Gold dust, spices, gums, ostrich feathers, and ivory are the chief exports, but some of these articles merely pass through the country from the surrounding territories. Cotton cloth is manufactured, and the natives work in iron, brass, copper, &c.—Shoa was formerly a prov-

ince of Abyssinia, and is still nominally a dependency of it. (See ABYSSINIA.) The form of government is an absolute monarchy, and about 30,000 soldiers can be mustered upon a case of emergency. The British government sent an expedition to Shoa in 1841 under Major Harrie, who negotiated a treaty and established friendly relations between the two powers.

SHODDY, a rag wool obtained from old blankets, stockings, carpets, flannels, &c., and now largely employed together with the similar article called mungo, obtained from old woollen garments and tailors' clippings, in mixing with new wool for manufacturing a variety of cloths, chiefly pilot cloths, petershams, &c. In some of these rag wool constitutes nine tenths of the whole material. In some parts of England the business of working up woollen rags has of late years become very extensive. Altogether about 50,000,000 lbs. of woollen and worsted rags are annually torn to pieces and converted into about 40,000,000 lbs. of mungo and shoddy, worth about £800,000. The shoddy is rated at *4d.* per lb. and the mungo at *6d.* About one third of the whole amount of the wool is produced at the town of Batley in the west riding of Yorkshire, and the remainder is the product of neighboring towns. The rags pass through a number of hands in the course of preparation for the powerful machines employed in tearing them to fibres. In the United States shoddy has become a manufacture of considerable importance, and the article is also imported from England. Six factories in the state of New York are engaged in its production, in the towns of Watervliet, Troy, Newburg, and Marlborough. Its presence in fabrics is detected in wearing garments by the collection of rolls of short wool between the cloth and the lining. The sale of shoddy is already a branch of business of some importance in Cedar street, New York.

SHOE, a covering for the foot, commonly made of leather. If furnished with a top for enclosing the lower part of the leg, the article is called a boot; but a general description of the various coverings for the feet may properly be given under the present heading. The oldest form is that of the sandal, a flat sole to be worn under the foot, and secured to it by thongs, one of which passed over 4 of the toes and between the great and second toe. The ancient Egyptians made sandals of leather, and others for the priests of palm leaves and papyrus. Specimens from their tombs are preserved in the British museum, formed of strips of palm leaf nicely fitted together and furnished with bands of the stem of the papyrus. The Hebrews made use of similar protections for the feet, sometimes formed of linen and of wood, while those for soldiers were of brass or iron. Among the ancient Greeks and Romans the use of shoes was not general. Spartan youths were trained to go barefoot and the heroes of Homer are usually described as without shoes when armed for battle. Socrates, Phocion, and Cato fre-

quently went barefoot. The females, however, wore shoes, and their use finally became universal. Great diversity prevailed in their fashion, and the several sorts were named from the person who introduced them or from the place whence they came; as the "shoes of Alcibiades," "Persian," "Cretan," "Athenian shoes," &c. The Lacedæmonians wore red shoes, and the same were put on by the chief magistrates of Rome on ceremonial occasions. The *calceus* was like modern shoes in form, covering the whole foot, and tied with latches or strings. Those of senators and patricians were high like buskins, ornamented with an ivory crescent, and called *calcei lunati*. Some were made with tops, and of all lengths, even to covering the whole leg; these were called *calceamenta* and *cothurni*. The tops were often of the skins of wild animals, lacing up in front, and ornamented at the upper extremity with the paws and heads arranged in a flap that turned over. The skin was dyed purple or some other bright color, and great care was evidently taken to procure an exact fit, as appears in the representations of the shoes upon ancient statues. They were variously ornamented with imitations of jewels, and sometimes with cameos. It was common to make them open at the toe, so that this part of the foot was left exposed.—Wooden shoes were in common use throughout Europe in the 9th and 10th centuries, and were worn even by the first princes. Great attention however was directed in the middle ages to this portion of the dress, as well as to the covering for the head (see *HAT*), and equal extravagances were adopted in both articles. The shoes were worn of different colors, and the stockings also were unlike each other, and of different colors from either of the shoes. In the reign of William Rufus a famous beau, Robert, surnamed the Horned, introduced shoes with long-pointed toes twisted like a ram's horn. Though strongly inveighed against, the style became fashionable, and in the reign of Richard II. the points had increased to such extent that they reached the knee, to which they were secured by chains of silver or gold. The upper parts were cut to imitate the windows of a church, and the whole was made extravagantly conspicuous. For 3 centuries the clergy, popes, and public officers sought in vain by declamations, bulls, and orders to break up the fashion. By act of parliament in 1488 shoemakers were prohibited making for the "unprivileged classes" any shoes with points more than 2 inches long; and afterward excommunication was denounced against any persons wearing such. The extravagant taste was then directed to the width of the toe, till at last Queen Mary was impelled to restrict this by proclamation to 6 inches. In the 16th century shoes were made of elegant buff-colored Spanish leather, with tops of enormous dimensions spreading over so widely as to greatly obstruct the movement of the feet in walking. The Puritans wore such boot tops, and after the

restoration of Charles II. the French custom was introduced of ornamenting the upper edge with lace. The present simple form of shoe was adopted in the early part of the 17th century, and in the latter portion of the same the shoe buckle began to be used. During the succeeding century this continued to be a very conspicuous ornament, and so many were dependent upon its manufacture in England, that when it began to be unfashionable in the commencement of the present century, the prince of Wales sought to keep up the custom of wearing it for the sake of the buckle makers. Shoes worn by ladies in the last century were sometimes very elaborate and costly, made of brightly-colored silk, ornamented with gold or silver stars and binding of different colored silks from the shoe itself. Of all the diversities of shoes worn by various nations, none are so strange and unnatural as the slippers of the Chinese ladies of rank. From childhood the growth of their feet is checked by bandages at the cost of extreme suffering, and almost entire inability ever to walk without assistance. They are thus enabled to wear shoes only 8 or 4 inches long, which are most unquestionable evidences of their high rank. The shoes are of silk beautifully embroidered with designs in gold and silver thread and colored silks. In European countries wooden shoes are in very general use among the peasantry; and though clumsy, they are said to be comfortable to the feet, durable, and cheap.—In the manufacture of shoes the highest perfection has been attained in the United States, due chiefly to the ingenuity and enterprise of the mechanics of Massachusetts. Early in the last century the lords of trade reported to parliament that the greater part of the leather used in Massachusetts was manufactured in the province. In Lynn, the making of women's shoes had been a branch of industry of some importance almost from the early settlement of the place. The business was conducted by the families of the manufacturers, and with no especial skill until the settlement there in 1750 of a Welsh shoemaker named John Adam Dagyr. By his superior workmanship he acquired great fame in the trade, and materially improved the style of the work in that region; so that in 1764 it was reported in the "London Chronicle" that shoes for women were made at Lynn exceeding in strength and beauty any that were usually imported from London. During the revolutionary war Massachusetts supplied great quantities of shoes for the army; but soon after its close the business was seriously checked by large importations. In Lynn however it revived, so that in 1788 its exports of women's shoes were 100,000 pairs. In 1795 there were 200 master workmen employed there, beside 600 journeymen and apprentices; and about 300,000 pairs of shoes were sent away, chiefly to southern markets. From the cities some were exported to Europe, and also direct from Lynn. The business continued steadily to in-

crease, until it amounted in 1855 to the production of 6,000,000 pairs of shoes and more than half as many boots, valued at upward of \$4,000,000. Other towns in eastern Massachusetts, especially those engaged in the fishing business, also entered into the manufacture of shoes. The fisheries furnished abundance of cheap oil required for preparing the leather, also seal skins from Labrador and Newfoundland, and the fishermen when at home found a profitable occupation in converting these products to their appropriate uses. Marblehead produces over \$1,000,000 worth of shoes annually. Haverhill is an important seat of the trade, and also Danvers, Worcester, Milford, Abington, Quincy, Braintree, and many other towns. In 1845 the total product of the state was valued at \$14,799,140; in 1860 at \$37,468,355, consisting of 32,678,167 pairs of shoes, and 11,578,885 pairs of boots. The number of persons employed was 76,559, of whom 43,907 were males, and 32,652 females, and many more were supported in various pursuits dependent on the trade. In Philadelphia also the shoe manufacture has attained considerable importance, the product amounting to about \$4,000,000 annually. The city has long been famed for the excellence of its sole leather and morocco, and its large supplies of these has afforded to the foreign shoemakers, chiefly Germans, who reside there, excellent facilities for the prosecution of the trade.—In 1809 a patent was granted to David Mead Randolph for a method of riveting soles and heels to the uppers instead of sewing them together, as had been before exclusively practised. He used a last sheathed on the bottom with an iron or steel plate. On this plate he laid the inner sole, and brought the edges of the upper leather around, and temporarily fastened them. The outer sole was then applied and secured by small nails driven through the 8 thicknesses and clenched against the plate. The first large manufactory with the use of machines for expediting the operation was established in Battersea, England, by Brunel, the famous inventor, and it was carried on by the invalid soldiers of Chelsea hospital for supplying shoes to the British army. The shoes were made with a welt riveted to the edge of the outer sole by small nails, and a row of longer nails outside of these secured the whole to the uppers and inner sole. The bottoms were studded with short nails of copper or iron to improve the wear. A number of ingenious machines, worked mostly by hand, were devised by Brunel for the various processes, as cutting out the leather, hardening it by rolling, punching the holes for the nails, forming the nails from slips of metal and inserting them in the holes, both by one machine, and for the others connected with the securing of the parts together. The machines do not appear to have continued in use after 1815, when on the establishment of peace the demand for army shoes fell off, and manual labor being more

abundant the machines were of less importance. The wooden peg, now used for fastening probably  $\frac{1}{4}$  of all the boots and shoes made, and which has largely contributed to cheapening these articles, is said to have been invented about the year 1818 by Joseph Walker of Hopkinton, Mass. Other improvements which have also contributed to the same end are machines of more recent invention, such as those for making lasts, for crimping the leather, and forming and setting the pegs. The application of sewing machines for stitching has of itself wonderfully expedited the manufacture, especially of the better sorts of shoes. Shoe factories are now large establishments worked by steam power, the buildings of several stories in height, upon each of which distinct branches of the trade are conducted. In one room of the basement is the steam engine, and in others the machines for cutting the leather, rolling it, shaping the soles, &c. In the story above, the leather is secured to the last and the outer soles are tacked on by hand preparatory to pegging. The pegging machine is supplied with a thin strip of wood 100 feet in length and neatly coiled up like a watch spring. Its width is the length of a peg. From the end of the coil at each revolution of the machine a peg is clipped off and falls into a cell, ready to be introduced by the next movement into its place in the shoe. Thus the pegs are produced and set at the rate of 14 every second. This operation being completed, the shoes go up to the next story, where the bottoms are smoothed and finished, when they are packed in the cases for the market. The stitching of the parts of the uppers together to prepare them for the last is done by sewing machines run by steam power and tended by women. Such are the operations in general connected with the manufacture of what are called sale shoes. Each establishment is usually limited to the production of only one sort, and in Massachusetts the same exclusiveness often extends to all the factories of a single town. Custom work is made upon a smaller scale and with much more care. The best shoemakers, to secure exact fit, keep separate lasts for each customer, which are changed as often as the change in the form of the foot requires a new fit. The soles, instead of being fastened to the uppers by pegging, are sewed on with waxed threads, which gives to the shoe a neater appearance and secures longer wear. The styles of shoes, boots, and half boots or bootees are numerous, and some are unsurpassed in graceful appearance and excellent workmanship by any made in Europe. Until within a few years a decided preference was given to French boots and shoes; but the importations have of late largely fallen off, and much work sold as foreign is really of domestic production. The neatest form of shoe or boot now worn is that known as the elastic gaiter, an American improvement upon the older form of gaiter, which was made with side lacings or buttons up the ankle. It

is provided with two triangular strips of elastic corrugated webbing, one inserted on each side the shoe, reaching to the top. This is easily stretched open sufficiently far to admit the foot, when it contracts, making a snug fit around the ankle. The material of these is calf skin, either plain or japanned, the latter being known as patent leather. (See JAPANNING.)—India rubber shoes were first brought from South America, and were produced by the natives, who collected the gum and run it in moulds of the forms of boots, shoes, bottles, &c. These were of very rude shapes; but the shoes were nevertheless an article of commerce, and were worn over boots on account of their water-proof quality. By the American process of vulcanization (see ΟΑΟΥΤΟΝΟΥ) new properties were given to the India rubber, and with only a little more than  $\frac{1}{4}$  of the gum mixed with  $\frac{3}{4}$  of much cheaper materials, an article was produced admirably calculated for light overshoes. The manufacture of these for men and women has been prosecuted with great success and upon a very large scale in several places in Connecticut and New Jersey; and for years past they have been the most favorite shoes of the kind in the principal European cities. Gutta percha also has been largely applied to the same manufacture, mixed with India rubber and with other substances.—Snow shoes, worn under the feet to prevent their sinking into the snow, are light maple frames of elliptical shape, rounded off in front and terminating in a long point behind, 3 to 4 feet in length and about a foot wide across the middle. The central portion included within the curved outer frame is filled in with a stiff network of strips of deer's hide or moose skin. A cross piece of wood in front serves as a support for the ball of the foot, which is fastened to the shoe by thongs brought up round it. The shoes used by women are smaller than those for men, and of a different shape. The feet of the person using the shoes are encased in moccasins of buckskin, sufficiently large to admit 8 or 4 thicknesses of blanket. The blanket is used not only to keep the feet warm, but also to prevent the toes from being chafed by the strings of buckskin which are passed over them. In walking with them, the foot is necessarily thrown outward with a swinging motion, which it takes some practice to acquire. These shoes, originally used by the northern Indians, are still manufactured exclusively by them, but are also worn by most residents of high northern territories. They are especially useful upon the light crust that often covers the deep snows of those regions, and which could hardly be otherwise traversed. Supported upon these, the hunter easily overtakes the deer and moose, whose pointed feet cut through the snow; and when well accustomed to their use, he travels with less fatigue than upon ordinary roads from 80 to 40 miles a day.

SHOOTING STARS. See METEOR.

SHORE, JANE, an English woman, the wife of Matthew or William Shore, a goldsmith in Lombard street, London, who became the mistress of King Edward IV. about 1470. She was exceedingly beautiful and amiable, and Sir Thomas More says of her that the king's favor "she never abused to any man's hurt, but to many a man's comfort and relief." After the death of the king she became attached to Lord Hastings; and when Richard III. had resolved on the destruction of that nobleman, he accused Jane Shore of witchcraft and of having withered his arm by sorcery. The king, though he sent her to prison and confiscated her goods, did not attempt to maintain his charge of witchcraft; but the bishop of London caused her to do public penance in the streets wrapped in a white sheet and with a taper in her hand. After the death of Hastings, Thomas Lynom, the king's solicitor, was so fascinated by her charms that he desired to marry her, but appears to have been prevented by the royal interference. She lived till the time of Henry VIII., and tradition represents her as dying of hunger in a ditch, a story which appears to be totally without foundation. Shakespeare has introduced her in his "Richard III.;" Rowe has made her the subject of a tragedy; and two French dramatists, Liadières and Lemer cier, have produced her story on the French stage.

SHORTHAND. See STENOGRAPHY.

SHOT. See BULLET, LEAD, and RIFLE.

SHOVELLER. See DUOK, vol. vi. p. 645.

SHOWER OF ASHES. See ASHES.

SHOWER OF STONES. See AEROLITE.

SHREW, or SHREW MOUSE, the common name of the insectivorous mammals of the family *soricida*, characterized by a general rat-like or mouse-like appearance, elongated and pointed muzzle, and soft fur. The distinct auricle of the ears, and the normal size of the anterior feet, not usually employed in digging, distinguish them from the moles. The skull is long and narrow, compressed at the orbits, malar bone and zygomatic arch wanting; the ribs are 12 to 14 pairs, 6 to 8 vertebrae without ribs, 3 to 5 sacral, 14 to 28 caudal; tibia and fibula united, clavicles thin, and pubic arch closed; stomach simple; caecum in some absent, in others very large; on the sides of the body, nearest the anterior limbs, and in some at the base of the tail, are a series of glands which secrete a strong musky fluid. The teeth vary from 28 to 32; there are 2 very large incisors in each jaw, nearly horizontal in the lower and much curved in the upper; canines absent; premolars  $\frac{3}{2}$  to  $\frac{4}{2}$ , molars  $\frac{3}{2}$ ; the posterior molars are many-pointed, and the anterior ones conical; the precise homologies of the cheek teeth have been the subject of much controversy. The snout ends in a naked muffle with the nostrils pierced on the sides; eyes very small, ears distinct, and feet nearly plantigrade and usually naked beneath; mammae 6 to 10; feet 5-toed, each with a claw. Their food consists of insects, worms, and mol-



larks, though they sometimes destroy small vertebrates and devour each other; they are voracious, and require much animal food; they are nocturnal, more or less aquatic in habit, do not hibernate, and the young are born blind and naked; most of the species live on the surface of the ground, and a few in burrows. They are spread over the northern hemisphere, sometimes going very far north, and the smaller species enduring severe cold; the sub-family *soricinæ* is the only one represented in North America; other sub-families are found in south and central Africa, Asia, the East Indies, and Europe; none as yet have been detected in South America.—Of the American genera, *neosorex* (Baird) has rather short ears, partly furred on both surfaces; teeth 32; tail longer than body and head, and hairs of equal length except a tuft at the tip; feet very large, with a fringe of ciliated hairs; muzzle very slender. The *N. navigator* (Cooper), from Washington territory, is 2 inches long and the tail 3; it is sooty brown above, mixed with hoary, and grayish white below; the body is stout and the fur soft. In the genus *sorex* (Linn.), which contains a great part of the species of the new and old worlds, the ears are large and valvular, the tail about as long as the body, and the feet moderate and not fringed; it is divided into 2 sections, one with 32 and the other with 30 teeth, most of the American species belonging in the former. Prof. Baird describes 12 species in vol. viii. of the Pacific railroad reports, varying in length from 3 to 4½ inches, of which the tail is about one half, ranging from blackish and brownish to grayish above and lighter to whitish below. The *S. personatus* (Geoffr.) is the least of the American shrews, and among the smallest of the quadrupeds of this country, being not quite 3 inches long; it belongs in the S. Atlantic states. Most of the species belong on the Pacific coast or in the N. W. territories. The *S. palustris* (Rich.), of the region of Hudson's bay, is 6 inches long, of which the tail is 2½; it is hoary black above and ashy gray below.—In the genus *blarina* (Gray) the body is stout; the tail shorter than the head, with short bristly hairs and small brush at tip; the hands large in proportion to the feet, and the soles usually hairy at the heels; skull short and broad; ears very short, with the external surface densely furred. This genus, peculiar to America, is also divided into sections, one with 32, the other with 30 teeth. The mole shrew (*B. talpoides*, Gray), the largest of the American shrews, is stout-bodied, 4½ inches long, with a tail of 1 inch; it is dark ashy gray above, with a brownish tinge, and paler below, with whitish feet; it is found from Nova Scotia to Lake Superior, south to Georgia and west to Ohio; it burrows deeper than the mole, which it resembles in habits. The short-tailed shrew (*B. brevicauda*, Gray) is rather smaller than the last, dark plumbeous above and but little lighter below; it occurs from Illinois to Nebraska. The Carolina shrew (*B.*

*Carolinensis*, Gray) is found from South Carolina to Missouri; it is 3½ inches long, of which the tail is ¾ inch, dark leaden gray above, and lighter below. Several other species are described by Baird, of which 2 are in Mexico and Texas.—In the old world, among the species of *sorex*, subdivided into several by Wagler, and called *musaraignes* by the French, may be mentioned the common European shrew (*S. araneus*, Linn.), 4½ to 5 inches long, of which the tail is 1½; the color is reddish mouse above and grayish below; it is found in dry places very generally over Europe, where it prowls about among the herbage, rooting up the earth with its pointed snout in search of insects and worms; it is very pugnacious, and the battles often end fatally to one or both parties; in the autumn great numbers are found dead in their favorite resorts, without apparent injury or evident cause of death; the musky secretion of the subcutaneous glands prevents their being devoured by cats and dogs, though they are often swallowed by hawks and owls. The water shrew (*S. fodiens*, Pall.), another European species, is found in the neighborhood of water, in which it swims and dives with great facility in search of insects; it makes burrows in the banks of streams; the color is dark above and whitish below. The Tuscan shrew (*S. Etruscus*, Savi), from S. Europe and N. Africa, is one of the smallest known mammals, being only 2½ inches long, of which the tail is 1 inch. The rat-tailed shrew (*S. myosurus*, Pall.), from India, is nearly as large as the brown rat, and of a dark brown color; it diffuses a very powerful odor of musk, impregnating every thing it touches.—An animal of this family not mentioned in its proper order is the desman (*myogalea Muscovitica*, Desm.); it is 7 inches long, with a tail of 8 inches more; it is found in the Volga and adjacent streams and lakes of S. E. Russia, and makes burrows in the banks, beginning under water and ascending to the level of the highest floods; the color is brown above and white below, the muzzle long, ending in a very flexible proboscis, the tail scaly and flattened on the sides, and the feet webbed; the food consists of leeches, frogs, small fish, and larvae, and in turn it is devoured by pikes and other voracious fishes; it is never seen on dry land. Another species occurs in the Pyrénées. Several other genera of the family are described.—The shrews appear during the miocene age in small numbers, and continue through the diluvial epoch to the present time, without material change.

SHREW MOLE. See MOLE.

SHREWSBURY, the county town and a parliamentary borough of Shropshire, England, on the river Severn, 153 m. N. N. W. from London; pop. of the borough in 1861, 22,055. The remains of the ancient castle are still standing; and there are many churches, one of which was formerly a Benedictine abbey. A portion of the ancient walls of the city still remains. The Severn is crossed by two bridges; there is a

canal, and a railroad connects Shrewsbury with London. The principal manufactures consist of thread, linen yarn, and canvas; and there are extensive iron works at Coleham, one of the suburbs. The salmon fishery of the Severn is valuable. There is a considerable trade carried on in Welsh flannels. Shrewsbury is a very ancient place, and was considered of importance in the time of the Romans. It returns two members to parliament.

SHRIKE. See BUTCHER BIRD.

SHRIMP, a common decapod or 10-footed and long-tailed crustacean, of the genus *crangon* (Fabr.); with the prawn (*palaemon*) it is called *crevette* by the French. The integument is corneous, the carapace considerably flattened, the abdomen very large, and the tail powerful; the rostrum very short; eyes large and free; antennae inserted about on the same transverse line, the internal pair the shortest and ending in two many-jointed filaments, the outer larger and longer; mandibles slender and without palpi; jaw feet moderate, with a terminal flattened joint and a short palpus on the inside; sternum very wide behind; 1st pair of feet strong, ending in a flattened hand having a movable hook opposed to an immovable tooth; 2d and 3d pairs of legs very slender, and the 4th and 5th much stronger; branchiae 7 on each side, consisting of horizontal lamellae; false swimming feet on under side of abdomen large, and caudal plates wide. The common shrimp (*C. vulgaris*, Fabr.) is 1½ to 2½ inches long, of a greenish gray color spotted with brown; the carapace is smooth, except a spine behind the rostrum, one on the sternum, and 7 on each side of the thorax; abdomen without ridges or spines, and middle caudal plate pointed and not grooved below. It is common on the coasts of Europe; in England and France it is much used as food, though considered inferior to the prawn. The shrimpers, as they are called, catch these animals in large nets with a semicircular mouth, which they push before them along the bottom of the sea during ebb tide; they wade nearly up to their middle, raising the nets from time to time, and removing the shrimps into a bag hung around the neck; this fishery gives employment to many hundred people in Great Britain. They are used occasionally as food in the United States, but chiefly as bait for smelts and other fishes. They are marine, and never quit the water; they move usually forward by jumps, but when in danger run backward; they can swim rapidly on the side, or with back or abdomen upward; they spawn throughout most of the year, carrying the eggs attached to the swimming appendages, and cast their skins from March to June. They feed on such small animals as they can seize with their claws, and on what may be killed by the waves or other causes, and are themselves devoured by fishes, aquatic birds, echini, and star fishes. They do not turn red by boiling. Other species are found in the Mediterranean.

In the polar seas are the *C. boreas* (Fabr.), 4 or 5 inches long, with spiny carapace and tail, abdomen and sternum with a median crest, and the 4th and 5th pairs of legs very large; and the *C. septemcarinatus* (Sab.), about 8 inches long. Though the American shrimp received from Say a different name from that of Europe, there seem to be no well marked specific differences.—The long-beaked, almost transparent crustacean, commonly called shrimp in New England, and used sometimes for bait, has been described by Mr. Stimpson as *palaemonopsis vulgaris*; it forms a very pleasing and active addition to the aquarium, and is everywhere abundant.

SHROPSHIRE, or SALOP, a W. county of England, bounded N. by Cheshire, E. by Staffordshire, S. by Worcestershire and Herefordshire, and W. by the Welsh counties of Radnor, Montgomery, and Denbigh; area, 1,291 sq. m.; pop. in 1861, 240,876. The surface is greatly diversified. Toward the frontiers of Wales it becomes wild and mountainous, while the other parts of the county are comparatively level. The Severn flows S. E. between the elevated and the level portions, and has a course within the county of nearly 70 m., all navigable. Its chief tributaries are the Tern and the Teme. There are several small lakes, Ellesmere, the largest, being only 116 acres in extent. There is communication by canals with all the important rivers of England. The soil varies much in quality, and there are considerable tracts of moorland, but much of it is easily worked and yields good crops. Large numbers of cattle are reared, and dairy produce is much attended to. Lead mines are worked to a considerable extent. Iron, coal, and limestone are found together in several places, and the manufacture of the first is extensively carried on. There are manufactures of machinery, glass, stone-china ware, earthenware, and coarse linen and woollen goods. Shropshire returns 11 members to parliament, viz.: 4 for the county, 2 each for the boroughs of Shrewsbury (the capital), Bridgenorth, and Wenlock, and 1 for Ludlow.

SHROVE TUESDAY, or SHROVE TIDE (Ang. Sax. *scryfan*, to confess), the day before the first day of Lent. It was so called because on that day the people were accustomed to confess their sins, and thus prepare for Lent. It was the custom after having made the confession to spend the remainder of the day in amusement, all kinds of which were tolerated provided flesh was abstained from. From the common practice of eating pancakes on that day, which is yet preserved, has arisen the vulgar usage of calling the day Pancake Tuesday. By the Germans it is called *Fast-Nacht* (fast eve), and by the French *Mardi gras* (fat Tuesday).

SHUBRICK, JOHN TEMPLAR, an officer of the U. S. navy, born in South Carolina in Sept. 1778, lost at sea in the Epervier sloop of war in 1816. He entered the service as a midship-

man in 1806, and was attached to the Chesapeake in her affair with the Leopard in 1807. In May, 1812, he was made a lieutenant, and served with distinguished gallantry in the Constitution in her action with the Guerriere in June, 1812, and in the Hornet in hers with the Peacock in Feb. 1813. For his services in both these engagements he received medals from congress. He was second lieutenant of the President when she was captured by a British squadron in Jan. 1815, and was highly spoken of by Commodore Decatur for his gallant conduct in the severe engagement which took place on that occasion. In the war with Algiers in 1815 he was first lieutenant of the Guerriere, the flag ship of Commodore Decatur, and was present in all the operations of that year against the Barbary powers. Upon the conclusion of peace with Algiers, he was despatched to the United States in command of the Epervier with the treaty. The vessel was never heard from after she left the Mediterranean, having doubtless foundered in a gale.

SHUMLA, a fortified city of European Turkey, in the pashalic of Silistria, Bulgaria, 57 m. S. S. W. from the city of Silistria, 48 m. W. from Varna, 63 m. S. E. from Rustchuk, and 225 m. N. W. from Constantinople; pop. about 50,000. The city lies on the N. slope of the Balkan, about midway between its crest and the lower Danube; it is situated in a gorge, enclosed on 3 sides by mountains, and encircled by a strong wall and double moat; it has also a citadel of great strength, and well fortified redoubts on the adjacent heights. Shumla and Varna are regarded as the keys of the Turkish capital on the land side, and the fortifications have therefore been made as nearly impregnable as possible. The inhabitants of the higher portion of the town are principally Turks; of the lower, Jews, Armenians, and Greeks. Silk, wine, and grain are the principal productions. There is also a considerable trade in Turkish morocco, and in soap and candles.—The town was burned in 811 by the emperor Nicephorus, and in 1087 it was besieged by the emperor Alexis. It was taken by the Turks in 1387, and embellished and fortified in 1689 and the 60 years that followed, mainly by the grand vizier Hassan, whose tomb is the most remarkable monument of the city. In all the wars between Turkey and Russia, it has formed the point of concentration of the Turkish army. Three times the Russians have attempted to take it, but each time unsuccessfully, in 1774, in 1810, and in 1828.

SHUTTLE, an instrument used in weaving for carrying back and forth the thread of the woof and distributing it between the layers of the warp. It carries in its inner portion, called its eye or chamber, a supply of the thread destined for the woof; and as part of the threads of the warp are moved up and the other portion down, the shuttle is thrown between them by hand, first to one side and then to the other.

SIAM, a native state of the island of Sumatra, lying on the E. coast between the mountains of the interior and the straits of Malacca, and the rivers Rakon and Kamper, or between the equator and about lat.  $3^{\circ}$  N., extending nearly 160 m. each way; area, 25,000 sq. m. The coast, which is much infested by pirates, is low, and fronted by several islands, the chief of which are Bankalis, Padang, Pantjir, Rantan, and Roupout. Siak is traversed S. W. and N. E. by the river Siak, which in the lower part of its course often overflows its banks. Timber of good quality, ivory, &c., are brought from the interior, and rice, cotton, hemp, and many kinds of fruits and vegetables are produced. Cattle and game are abundant.—The capital, of the same name, is situated upon both sides of the river Siak, about 40 m. from its mouth.

SIAM, the chief kingdom of the group styled Further India, or Indo-China. Siyam, from the dark color of the inhabitants or of the soil, is the ancient, and Muang T'ai, the kingdom of the free, the modern native appellation for the country; T'ai, the free, for the people. With its Laos, Cambodian, and Malay peninsular dependencies, it lies between lat.  $4^{\circ}$  and  $22^{\circ}$  N., and between long.  $98^{\circ}$  and  $105^{\circ}$  E.; greatest length 1,850 m., breadth 450 m.; area variously estimated from 190,000 to 290,000 sq. m.; pop. 5,000,000 to 8,000,000. The capital is Bangkok. Two S. E. mountain ranges from the Himalaya form general natural divisions from China on the N., Cochinchina and Cambodia on the E., and Burmah and the British possessions on the W. A third range, less continuous and direct, passes through the central regions; in this is situated the P'ra Bat, or mountain of "the sacred foot" print of Buddha, a Mecca for Buddhists. The gulf of Siam has a long coast line on the S. E. and W.; it has numerous islands, much precipitous shore, and several ports, of which Bangkok is the chief. It is never visited by typhoons or heavy gales.—The country is watered by several rivers, bearing the generic name Menam, "mother of waters," and taking the specific name or names from cities or provinces. The Menam Kong, Mekong, or river of Cambodia, is 1,500 m. long; its entrance is held by the Cochinchinese, or perhaps now by the French. The Meklong gives an avenue into Burmah, and a town of the same name near its mouth was the birthplace of the Siamese twins. The Menam Chow P'ya, Menam Bangkok, or simply and *par excellence* the Menam, is a noble river, which, rising like the Cambodia in S. W. China, and swelled by several large tributaries, now one, now several rivers, at length pours its great flood, 5 or 6 fathoms deep, 2 m. broad, and 900 m. from its source, into the gulf. A bar off the mouth alone prevents vessels drawing over 15 feet from ascending to or beyond Bangkok, 80 m. above. These rivers, with the very numerous intersecting canals, for rowing, not tracking, are the great highways of traffic. The plains,

irrigated and enriched by their annual overflow, are extensive and fertile; the valley of the Menam equals in richness that of the Nile, and in extent half of the state of New York.—The seasons are two, the wet or hot, and the dry or cool. The former, opening near the middle of March, not a succession of wholly rainy days, resembles a New York April and August combined. The annual rain fall is about 60 inches. April, the hottest month, has a maximum of 97° F., and a mean of 84°. In October the S. W. monsoon gives place to the N. E., which ushers in the dry and cool season; this is very fine, with only a few light showers throughout. January is the coolest month; but the mercury rarely falls below 65°, only thrice in the 11 years registered at Bangkok to 60°, and once to 54°. The mean annual temperature is 82½°, and the mean range 13°. Vegetation, in a climate so hot and humid, is luxurious, fruitful, and beautiful beyond description. Little more than ¼ of the lands are under cultivation, but these render a rich return for the rude and careless labors of the people. Rice, sugar, pepper, cotton, and hemp are the staple products. In the abundance, variety, and excellence of fruits, vegetables, and spices, Siam is unsurpassed. Many fruits, as the durian, mangosteen, and custard apple, are cultivated in large "gardens" or orchards, trenched, and watered by the daily tide; others, leaf, bud, flower, and fruit together, beautify the stately trees of the forest. In the forests are found gutta percha, lac, dammar, gamboge (from Cambodia), catechu, gum benjamin, and the odoriferous agalla or eagle wood; innumerable medicinal plants, herbs, and roots; sapan, fustic, rose woods, indigo, and other dyes; the lofty silk-cotton tree, with its soft silky floss (too brittle for the loom) for mattresses; the bamboo (of more than fourscore enumerated uses), the rattan, and the atap (humblest of the many palms), together forming the material of ¾ of the houses; the noble teak, stronger, more buoyant and durable than oak, with other ship and house timbers; iron, red, and white woods, and ebony; the banian and the sacred fig tree. The animal kingdom is no less varied and interesting. Most celebrated is the white elephant, a dark-cream albino, prized and honored as very rare, as belonging to the regalia, as the tabernacle of some soul far advanced toward Nirvana or Nippan, and as the form associated with the appearing of Buddhas. In his house a white monkey is kept to ward off evil spirits. The national standard is a white elephant on a crimson ground. White animals are the favorite abodes of transmigrating souls. Among other animals are the tiger, whose bones and fetid carcass are exported for the Chinese materia medica; the pangolin, which rolls its head under and sharp-scaled tail around its scaly body when attacked; the rhinoceros, whose super-leathery skin is sometimes eaten; the buffalo and ox, with the elephant, the beasts

of burden; dogs and cats unowned and innumerable, with vultures and crows, the scavengers; the birds of gorgeous plumage, many of great size, many of sweetest song, and one, "the edible swallow," whose nest is the delight of Chinese and Parisian gourmands; the turtles and crocodiles, of which latter 320, from 3 to 25 feet long, have been counted in 2 days' travel by boat; the flying, tree, gecko, and other lizards; the python, viper, and cobra de capello; the anabas, fish which climb trees and wander a mile or two from the water; the mollusks, of which some 25 new shells (one species named *unio Housei* from the discoverer) are described by Dr. Lea and Mr. Haines in the scientific journals of New York and Philadelphia; the singing fish or mollusk, described in Tennant's "Ceylon;" and the mantis and firefly, beautiful among the many beautiful insects.—Gold, copper, iron, tin, and lead all abound, and in great purity; but by reason of the rudeness of working, the jealousy toward foreigners, and the fevers and hardships of the jungle, their vast wealth is comparatively undeveloped. Antimony, zinc, sulphur, and arsenic also exist, and silver in combination. Salt is largely manufactured by solar evaporation, and saltpetre less. Mining, previously under the strict surveillance of government, and carried on chiefly by Chinese, is under late treaties exciting much interest among Europeans. Rubies, spinel, corundum, sapphire, amethyst, garnet, topaz, and other precious stones are found.—The Siamese and Siamo-Chinese number 2,500,000 or 3,000,000; the Chinese, Cochinese, Cambodians, Laos, Karens, Burmese, Peguans, and Malays constitute the remainder of the population. The Siamese are of Mongolian origin and Laos or Shyan descent. They are olive-colored and of medium height. The head is large, face broad, forehead low, cheek bones prominent, jaw bones in retreat very divergent; mouth capacious, lips thick, nose heavy, and eyes black and without the Chinese turn of the lid. The teeth are stained black, and sometimes serrated. The hair is all plucked from the face in youth, and the most of the head is shaved bi-monthly. A black bristling tuft 4 or 5 inches broad and 2 inches high is left on the top; that of the females, whose hair is only closely cut, is often encircled by a thread of bare skin whence 2 or 3 hairs' breadths have been uprooted. The dress consists of a cotton waist cloth (to which females add a silk shoulder scarf), a jacket for the cold, and a straw hat for the sun. Children, to 7 or 8 years, are clad only in jewels, fig leaves, flowers, and turmeric. Priests, with head entirely shaven and uncovered, wear several yellow robes of cotton and silk. Kings and nobles on state occasions wear silk and gold brocades and high conical hats. The Siamese are indolent and careless, improvident, greedy, and unthankful, untruthful and dishonest, impure and intemperate, servile and cruel, inquisitive, igno-

rant, and vain, and superstitious and cowardly. At the same time they are peaceable, respectful and polite to foreigners, superiors, and the aged, modest and decorous in public, affectionate to kindred, kind to the poor and imbecile, and ambitious of learning and improvement. The dwellings are of one story, partly to prevent the indignity of another's walking over the head. They consist of huts, built on piles, of bamboo, roofed and sided with atap leaf; boats, serving also as peddling stalls or vehicles; floating houses, of panelled teak, rising and falling with the tide on bamboo rafts; and palaces, of white stuccoed brick, adorned with gilding, carving, painting, foreign furniture, pictures, gold, silver, china, and glass. These palaces are not of Chinese, but rather of Indian architecture, and they often occupy several acres, with the dwellings of the wives, the quarters of the servants, and the grounds, which are paved, shaded, adorned with flowers, and enclosed by high walls. Marriage takes place as early as 18 for males and 14 for females, without the aid of magistrates or priests, though the latter may be present to make prayers, and especially to feast and to receive presents. The number of wives, ordinarily one, in the palaces reaches scores and hundreds; but the first is the wife proper, to whom the rest are subject. The wife rarely goes out with the husband, and always in the rear. Among the *élite* she does not eat with him, but serves, crouched on knees and elbows. The poor work the fields, row, market, and keep the shops. Only a few of the highest enjoy any education. But the ordinary treatment of woman is affectionate, and her condition superior to that of women in the East generally. Social distinctions are very numerous, and are in the law represented numerically, from 100,000 for the second king down to 5 for the lowest slave. Before "the lord of life" on the throne, far above numerical representation, all crawl and crouch, or, with head bowed to the ground, lie "dust at the sacred feet." Prince is approached by noble, noble by lord, lord by master, &c., each with body bent, eyes prone, and hands

folded and raised to the forehead or above the head, giving and receiving homage. An annual service of 3 months is paid to the king by all, save the Chinese triennially taxed. One third of the common people, it is largely estimated, are slaves, by birth, by debt (gambling or other), by redemption from the penalty of crime, by capture, &c. Men sell their children, their wives, or themselves; convicts in scores clank their chains about the streets; villages of thousands are made up of neighboring peoples seized in war. Yet Siamese life, social and domestic, bond and free, high and low, is in the main comfortable, and is moreover gladdened by many sports, amusements, and holidays. On all great occasions, civil, religious, and funeral, the coffers of kings and nobles are opened widely for merry-making for the people, and merit-making for themselves. The only honorable disposal of the dead is by burning. The badges of mourning are white robes and an entire shaving of the head.—In commerce Bangkok once ranked second only to Calcutta and Canton, but all-grasping monopolies, exorbitant duties, and numberless restrictions had well nigh stifled production and banished trade. In 1855-'6 new treaties were negotiated for Great Britain, the United States, and France, by Sir John Bowring, Hon. Townsend Harris, and Count de Montigny. The purchase of land is now allowed; the monopolies and tonnage duties are abolished; imports pay 3 per cent. in money or kind, and exports one duty only, according to tariff. The immediate and happy results of this enlarged and wise policy are seen in the fact that British (including Mussulman) arrivals, which had not averaged 12 per annum, in 1858 reached 81; and American arrivals, of which there had been but one in 17 years, reached 54. The total arrivals of 1860 were 286, departures 270. The following table, approximate only, as the native registries are very imperfect, will show the nature and extent of the principal exports, in piculs of 133½ lbs., for 1857 in foreign vessels only, and for the other years in both foreign and native:

Years.	Rice.	Sapan wood.	Sugar.	Pepper.	Hides.	Horns.	Cardamoms.	Dried ditto.	Teel seed.	Tin.	Stick lac.	Silk.	Paddy.
1857..	1,047,650	190,412	149,789	9,840	5,176	916	561	876	6,518	674	1,094	678	970
1858..	1,175,385	199,323	153,596	20,382	8,482	2,832	559	1,697	19,007	774	8,800	704	19,513
1859..	839,731	208,797	208,096	13,504	25,536	4,938	1,007	1,586	6,249	789	2,984	1,079	6,280
1860..	1,602,215	67,546	143,504	14,350	6,724	2,139	293	....	5,623	74	2,177	400	4,773

The imports of 1859, consisting of shirtings, prints, and other piece goods, machinery, opium, Mexican dollars, &c., were about \$3,000,000, of which \$88,000 were from San Francisco and New York. Small bars of silver cut into pieces, stamped, and bent into an irregular oval, in value 7½, 15, and 60 cents, with cowries, form the currency. Dollars are also now current, though usually exchanged for silver ticals, at moderate rates, at the treasury. The rate of interest is about 30 per cent. The inland trade is conducted chiefly by boats. The merchant service consists of many junks and of 75

square-rigged vessels of as high as 1,400 tons. The first keel of the latter class was laid in 1835. The steam service, commenced in 1855, numbers 25 vessels, some of which are 200 feet in length. Foreign steamers ply bi-monthly, with mails, between Bangkok and Singapore. Both will soon be stations of the great English telegraph to Calcutta, Alexandria, &c. A ship canal across the peninsula near lat. 11° N., saving the great *détour* from Calcutta to Canton *via* Singapore, has been in contemplation. The United States and European treaty powers are represented by resident consuls at Bangkok.

—The Siamese language is written under the line from left to right, and the printed character is nearly the same. It is monosyllabic except as affected by the Pali and other languages, and without inflections for any part of speech. The orthoëpy is difficult, and the orthography, which is very laborious, is confined mostly to priests and scribes. The language of court and of books is filled with entirely different terms; many for objects, acts, and ideas are from the Pali. The plebeian word for foot or hand would be insulting applied to royalty. The sacred literature, in the Pali, as also much scientific, is written with styles on slips of palm leaf. The 400 principal works, of 4,000 volumes, contain, amid the false, fanciful, and pernicious, much of what is true, real, and good in morals, philosophy, and religion. The secular literature, written with steatite or gamboge on folds of black paper, consists of some 250 principal works, of over 2,000 volumes, many of which are metrical. It lacks manly strength and freedom, abounds in verbiage and vileness, yet is graced with much that is beautiful in sentiment and expression. Education, limited, superficial, and erroneous, is afforded gratuitously at the temples, to the males, 80 or 90 per cent. of whom read, two thirds perhaps understandingly. The drama is much cultivated, and dramatic companies are attached to the palaces and gaming houses. The music is unwritten, simple, plaintive, and pleasing. Bands of 10 or 12 instruments, most resembling Javanese, are a part of every establishment of wealth. The second king has also a band of foreign instruments, which, led by his son George Washington, makes the city resound with the national airs of the West. Gaudy and incongruous paintings, of rude perspective, chiefly adorn the temples. The medical art is in a very barbarous state.—Nowhere else does Buddhism hold so pure and absolute a sway as in Siam. It is of the Ceylonese rather than Chinese type. The present king "assumed the reins of government, to nourish and sustain henceforward the most excellent Buddhist religion, and the excellent nobles and lords and servants at the dust of the sacred feet, and the people of the realm." But while he is *ex officio* defender of the faith of Buddha, and yearly expends large sums in the erection, repair, and visitation of temples, and in the support of the priests, his is not the vulgar religion of the masses. He is the source and head of a party who reject the old cosmogony and other vagaries and falsehoods, and hold genuine only the simple ethics of Gaudama. But his "pure, original, ancient philosophy" is too ethereal and transcendental to be particularly appreciable, much less influential. The wats or temples, resembling not the Chinese, but distantly the Egyptian architecture, are among the most beautiful and splendid in the East. They loom, amid vast, choicely situated, paved parks, with white walls gleaming through the leaves, serrate roofs and spacious domes

and lofty *prachadi* spires, all painted and gilded and glazed, vocal with air-rung bells, and perfectly resplendent in the sunlight. One is estimated to have cost, with all its paraphernalia, over \$800,000. It contains 900 images of Buddha, the principal of which, the great reclining god, was found by actual measurement and estimate to be 158 feet long and 45 high from the top of the head, with feet each 16½ feet long and 5 broad. The whole, save the feet, beautifully and curiously inlaid with pearl, is heavily overlaid with pure gold. The ascetic, celibate, and mendicant priesthood once numbered 100,000 in all, and, with novitiates, 30,000 in the capital alone; but now, being compelled to work somewhat for themselves, they are much fewer. Missions have been carried on by the Roman Catholics, under the greatest vicissitudes, since the middle of the 16th century. The missionaries are French, and their converts, reckoned at several thousands, are mainly Cochinchinese and natives allied to the Portuguese. Protestant missions date from the visits of Gutzlaff, Tomlin, and Abeel in 1828-'31, and properly from the settlement of Jones in 1833. Two representatives of the American Baptist missionary union, 7 of the Presbyterian board of foreign missions, and 1 of the American missionary association, are now laboring in the country, though as yet apparently with but slight results.—The government of Siam is theoretically a duarchy, practically a monarchy. While there is a second or vice-king, the first or senior king is actual sovereign. The crown is hereditary, but without primogeniture, being bequeathed, with the sanction of princes and nobles, to any son of the queen. But intrigue and violence have often diverted the succession from the high royal line. The last king, an illegitimate and far inferior son, usurped and for 27 years held the throne, in bar of the right of the son designated by the father as the crown prince. The king is by title "sacred lord of heads," "possessor of all," and property and life are at his will, to be taken at governmental necessity or caprice; but many considerations conspire to render a violent and arbitrary exercise of this absolute power comparatively unfrequent. The queen consort, the wife supreme among hundreds, must be of native and royal blood, and she is by frightful barriers and penalties kept from all possible intercourse with an inferior of the other sex. She never becomes regent, or takes any part in political affairs, but is treated with the highest deference. She has a separate court, in which appear the princesses, former and present, who, not allowed to marry beneath them, rarely marry at all. She has her female guards in uniform and arms. The number of females within the palace is, on royal authority, 5,000, and of males about the same. The second king has also a separate palace, seraglio, officers, retainers, and soldiers, only second to those of the first. Though never appearing at the audiences of the nobles with the senior king, his

opinion and sanction are sought on important state policy, and his name is associated in treaties. His position, not understood, seems to be that of counsellor, not of co-ruler or successor. A cabinet and a council deliberate daily, without legislative functions, at the palace. The number of salaried officers of the first king is 22,754, and those of the second are somewhat less numerous. The revenues from all sources were in 1854 estimated at \$16,000,000.—There is a very ancient written code of laws, the acts and decisions of the kings, and an unwritten code, scarcely less authoritative, of traditional usages; both are often absurd, unjust, and cruel, and both liable to disregard at the royal will. Through the venality, caprice, or passion of the courts, moreover, justice shamefully suffers. Civil cases usually terminate when one or both of the parties are depleted. In a grave criminal case, one may regard himself as happy who, though perfectly and evidently innocent, after weeks or months of anxiety, suffering, and extortion, escapes the iron grip of the law or its harpies with life and a waist cloth. More than 25 classes are excluded, many for the most trivial reasons, from testifying. The oath is one of the most fearful in the world. The penalties are various, from bamboozing to beheading. Capital crimes are now very few. Treason, very comprehensive, is punished by beating the convict, enclosed in a large sack, nearly to death, and then casting him loaded into the river. The police and military force is small and poorly disciplined; yet the conservation of municipal peace and national rights is notable. An act of the U. S. congress in 1860 extends over Americans in Siam (and other eastern treaty countries) the authority of American laws, common law, equity and admiralty, and authorizes a marshal for the execution of process. It makes the murder of a native, or joining an insurrection against the government, punishable with death.—The earlier history of Siam is involved in obscurity. It dates back some centuries B. C., but only the annals subsequent to the founding of Ayuthia, a former capital, A. D. 1350, can be deemed authentic. In the 16th century the dominion extended to Singapore, and the first western connection was made with the Portuguese and Spanish. In 1604 the Dutch established relations; in 1662 an English ship arrived; and the latter part of the century is remarkable for the grand embassies from and to Louis XIV. of France, and the later bloody and almost utter overthrow of French influence. In 1782 the present dynasty ascended the throne, and transferred the seat of government from Ayuthia (sacked by the Burmese) to Bangkok. In 1822 and 1825 treaties were made with Great Britain, or rather with the East India company, through Mr. Crawford and Capt. Burney. In 1833 a treaty was made with the United States through the Hon. Edmund Roberts. In 1851 the reigning king ascended the throne, with the title P'ra Bart Somdet P'ra Paramend

Maha Mongkut P'ra Chom Klau Chau Yu Hua; and his brother, with the title P'ra Bart Somdet P'ra Pawarendr Ramesr Mahiswaree P'ra Pin Klau Chau Yu Hua, became second or junior king. These kings are among the most remarkable characters of the East and of the age. In their attainments in languages, literature, science, and general information, adoption of foreign ideas and improvements, wise and humane government, urbanity and kindness to foreigners, liberal and enlightened intercourse with other powers, and in their high aspirations to win for Siam a place in the family of nations, they have taken a wonderful and admirable position. The first embassy from the country for more than two centuries was sent to England, visiting France, in 1857; and another was sent to France, visiting Rome, in 1861.—Works on Siam are few. The best are Crawford's "Embassy to Siam and Oochin-China," Pallagoix's *Description du royaume Thai ou Siam* (2 vols. 18mo., Paris, 1854), and Bowring's "Kingdom and People of Siam" (London, 1857). An American work, entitled "Siam and the Siamese," is about (1861) to go to press.

SIAMANG, an ape of the gibbon group, of the genus *hylobates* (Ill.), but separated by Gray from this genus as *siamanga*. It is characterized by a small head, absence of tail and cheek pouches, and arms so long that the hands touch the ground when it is standing erect; callosities present; the skull is flat, the margin of the orbits prominent, and the canines, especially the upper, large. The character which led to its separation from *hylobates* is having the 2d and 3d toes of the hind feet united by a narrow membrane the whole length of the 1st phalanx. The *H. (S.) syndactylus* (Ill.) was discovered by Sir Stamford Raffles in the island of Sumatra, where it occurs in troops headed by old and courageous males, which the natives regard as invulnerable. It is about 3 feet high, of a black color with chin and brows rufous, and the throat bare, like the sac of a large goitre; the hair is long, thick, soft, and shining; the face is black, the muzzle short, facial angle 60° to 65°, and the forehead gradually inclined backward and covered with smooth and straight hair; the nose is flat above and prominent below, the large circular nostrils pierced in the sides of a cartilaginous eminence united to the upper lip by a narrow apex; the ears closely applied to the head like those of man, but concealed by the thick hair; the hair of the body slightly curved and frizzled like a shaggy fleece; mouth very large; fingers very slender and uncommonly long. It is rather slow in its motions, vigilant and shy, living principally in the forests of the rocky districts; most active at sunrise and sunset, the troops set up a loud and monotonous howl in concert; it is stupid, mild, and timid in captivity.

SIAMESE TWINS. See MONSTER.

SIBBERN, FREDERIK CHRISTIAN, a Danish philosopher and publicist, born in Copenhagen, July 18, 1785. He was educated at the uni-



versity of Copenhagen, at which in 1818 he was appointed assistant professor of philosophy, and in 1829 he became titular professor. His philosophical opinions are founded on those of Schelling, and have exercised an important influence upon the present generation in Denmark, where philosophy until recently was regarded as a foreign importation and was studied chiefly as an accessory to other sciences. His familiarity with the natural sciences has induced him to apply the methods of analysis applicable thereto to the operations of the human mind, and with results often remarkable. His works in this department are numerous, as also in that of public law and politics.

SIBERIA, a part of the Russian dominions which occupies the whole of N. Asia, bounded N. by the Arctic ocean, E. by Behring's straits, the sea of Kamtchatka, and the N. Pacific ocean, S. by the sea of Okhotsk, China, and Toorkistan, and W. by European Russia, from which it is separated by the Ural mountains, the Ural river, and the Caspian sea. It extends from lat.  $45^{\circ} 30'$  to  $77^{\circ} 40'$  N. and from long.  $52^{\circ} 30'$  to  $190^{\circ}$  E.; extreme length about 8,600 m., breadth 2,000 m.; area, exclusive of the recent acquisitions on the Amoor, 4,812,389 sq. m.; pop. in 1856, 4,102,815. For administrative purposes it is divided into East and West Siberia, the latter of which (capital, Tobolsk) contains the governments of Tobolsk and Tomsk, and the land of the Russian Kirgheez, and the former (capital, Irkutsk) the governments of Yeniseisk and Irkutsk, and the provinces of Yakootsk, Okhotsk, Kamtchatka, and Tchouktohi, which with their chief towns are described in separate articles. Beside these, the governments of Perm and Orenburg are partly in Siberia.—The shores of Siberia, both along the Arctic ocean and the seas which bound the country on the E. and S., are indented with numerous bays and inlets. On the N. coast, between the mouths of the rivers Lena and Indighirka, there is a group of barren islands, named in honor of their discoverer Liakhoff islands. Three of them are from 60 to 100 m. long, and from 20 to 40 m. broad, and the remainder are all small. They are quite destitute of vegetation, and the climate is so cold that even in summer the snow does not entirely disappear. Their surface is covered with alternate layers of sand and ice, in which immense numbers of fossil remains of elephants and other animals are found imbedded. Along the whole N. shore of Siberia the sea is frozen over for more than half the year; and at other seasons the ice floats about in large masses, which render navigation so dangerous that the survey of the northernmost part of the coast has not yet been completed. The N. part of the island of Saghalien, together with some smaller islands which lie off the E. coast, also form part of Siberia.—An extensive mountain range which has its E. extremity at Cape Vostotchnoi, or East cape, in Behring's straits, extends in a S. W. direction across the cen-

tre of the province of Tchouktohi, and then through that of Okhotsk nearly parallel to the N. W. coast of the sea of that name. After entering Yakootsk it turns more to the W., crossing the S. part of that government, and continues in the same general direction till it joins the steppe in the former province of Omsk, after forming the boundary line between Siberia and China for more than 2,000 m. The general height of this range is about 3,000 feet above the sea. In the E. and along the shores of the sea of Okhotsk it is called the Stanovoi mountains; after entering the government of Yakootsk the name is changed to the Yablonoi mountains; and still further W. it is known as the mountains of Daocoria, and finally as the Altai mountains. To the E. of long.  $105^{\circ}$  this range throws off numerous offsets, which, together with mountain ranges that traverse the country in different directions, cover a great deal of the surface of this part of Siberia. The Ural mountains stretch along the greater part of the W. frontier, forming the boundary line between European and Asiatic Russia for about 1,200 m.—With the exception of the Amoor and a few streams of less importance, the rivers of Siberia all flow into the Arctic ocean. The Obi ranks among the largest rivers in the world, and many of its tributaries are of great size; the most important of these are the Irtysh, Ishim, Tobol, Tom, Tchulim, and Ket. The Yenisei is by some authorities said to drain a greater extent of surface and to have a longer course than the Obi; its chief affluents are the Lower Tunguska, Elaqui, Podia, and Upper Tunguska or Angara. The Lena is nearly as large as either of the preceding, and the principal streams which join it are the Vilioi, Vitim, Aldan, and Olekma. The other rivers of most importance which flow into the Arctic ocean are the Nadim, Poor, Taz, Khatanga, Anabara, Olen, Olenek, Yana, Indighirka, Lazeya, Kolyma, and Tchaoon. The chief rivers flowing into the seas which bound Siberia on the E. and S. are the Amoor or Saghalien, which forms part of the S. boundary and receives several considerable tributaries from the N., the most important of which are the united stream formed by the Tchikiri and Silimpadi; the Anadir, flowing into the gulf of the same name; and the Okhotsk, which has its mouth on the W. shore of the sea of Okhotsk. Few of these rivers present any other obstacles to navigation than that of being frozen over for many months of the year. The Ural river, which flows into the Caspian sea, forms the boundary for about 500 m. between European and Asiatic Russia. The Sir Daria or Jaxartes flows into the sea of Aral; and the rivers Koowen and Tchoui extend between Lake Balkash and the sea of Aral, and divide Toorkistan from Siberia. Beside the Caspian sea and the sea of Aral, which are both partly within the boundaries of Siberia, the most important lakes are those of Baikal, in the government of Irkutsk, and Balkash, which lies in the E. part of the Kir-

gheez territory, and partly within the Chinese empire.—Although Siberia is nearly  $\frac{1}{2}$  larger than the whole of Europe, yet considering its vast extent there is comparatively little diversity of surface. The country which lies W. of long.  $105^{\circ}$  has a very marked difference, however, from that which extends to the E. of that meridian. With the exception of the mountains on its frontiers, the whole of the western region forms one vast plain, only broken by the courses of numerous rivers and a few small hills. The S. part of this plain has a general elevation of about 2,000 feet, while toward the N. it is very little above the level of the sea, and in many places becomes inundated at high water. In the S. part of the government of Tobolsk, which occupies the S. W. extremity of Siberia, and the adjoining Kirgheez territory, the greater part of the surface consists of the steppe of Ishim, and the smaller one of Baraba, between the rivers Irtysh and Obi. These steppes are in many places incrustated with salt, and in others have a very scanty vegetation, but there are spots with excellent pasturage, on which the nomadic tribes feed their flocks and herds. In the government of Tomsk and the S. part of Yeniseisk, or that part of the W. district which is not included in the steppes of Ishim and Baraba, and which lies between the S. frontier and lat.  $60^{\circ}$  to  $64^{\circ}$ , there is much fine land well suited for agricultural purposes, though where it borders upon the steppes it partakes of their barren nature. Large tracts of the surface of this region are covered with forests, and it is only along the banks of the rivers that the soil is regularly cultivated. To the N. of the districts just described extensive forests of birch, pine, and fir, frequented by numerous wild animals, extend to about lat.  $66^{\circ}$ . Barley and rye are grown in some places in this region, and turnips thrive remarkably well. It is thinly inhabited, and the people subsist chiefly upon game and fish, and by the sale of furs, which they procure in large numbers. N. of the territory, and between it and the shores of the Arctic ocean, there extends a low flat country covered with moss, and with only a few stunted trees toward its S. extremity. The temperature is so low that even in summer ice is found within a few inches of the surface. The reindeer is found here, both wild and domesticated, in great numbers; white bears and foxes are hunted for their furs; and the rivers abound with fish. The portion of Siberia which lies to the E. of long.  $105^{\circ}$  has a more diversified surface than the region just described. It is generally high and rugged, and has but little land suited for agricultural purposes. In the S. part of Irkutsk and in the province of Yakutsk, the hills and mountains are covered for the greater part of the year with good pasture, and in favorable places all the grains of temperate climates are grown. The oak and hazel are found here, but not in any other part of Siberia. Grain continues to be culti-

vated in places as far N. as lat.  $61^{\circ}$ ; but by far the greater part of the country is covered with open forests of pine and fir, in which numerous herds of cattle find tolerable pasturage at certain seasons. From long.  $105^{\circ}$  to the river Lena the N. part of the country is very imperfectly known, but it is believed to consist partly of pasture land well adapted for rearing cattle, and partly of moorland wastes frequented by numerous herds of reindeer. Between the Lena and the Kolyma, N. of lat.  $61^{\circ}$ , there are wide valleys with stunted larch and birch trees, numerous small lakes, some of which are well stocked with fish, and several morasses. East of the Kolyma to Behring's straits and the shores of the sea of Kamtschatka, including the peninsula of that name, the country is traversed in various directions by several mountain ranges that have a general elevation of from 2,000 to 3,000 feet above the sea.—There are extensive tracts of Siberia the geological formations of which are very little known; and it is only in particular localities that our information is at all definite. Granite and crystalline schists are found in the Ural mountains, and also in the Altai between long.  $85^{\circ}$  and  $120^{\circ}$  E., and as far N. as lat.  $57^{\circ}$ , and again in the E. extremity of the country between long.  $165^{\circ}$  and the shores of Behring's straits. Volcanic rocks occur chiefly in the S., and are found along with the granite and crystalline schists; and a few active volcanoes exist. Other rocks, belonging to the silurian, devonian, and carboniferous systems, are found in the S. and extending toward the interior of the country. The tertiary formation, however, is the most extensively developed, and is found throughout the whole of Siberia. The shores of the Arctic ocean are covered for a considerable distance inland, and for a great part of their extent, by a deep alluvial deposit which contains immense numbers of fossil remains of extinct species of elephants and other animals, from which large quantities of ivory are procured. Mining operations in Siberia are confined to three parts of the country. The most W. district is situated on the E. face of the Ural mountains, and occupies a tract about 40 m. broad, extending between lat.  $56^{\circ}$  and  $60^{\circ}$  N. Gold, silver, platinum, copper and iron ores, and precious stones, are all found in this territory. (See EKATERINBURG.) The second district lies on the N. side of the Altai mountains, in the neighborhood of the head streams of the river Irtysh; silver and copper are found here, and gold and lead in smaller quantities. The third district lies in the Yablonoi mountains to the E. of long.  $120^{\circ}$ ; in this gold, silver, lead, zinc, antimony, iron, and arsenic are all found, and there are emerald and topaz mines of great value. Diamonds are occasionally found on the E. slopes of the Ural mountains. Porphyry, jasper, and malachite, for ornamental uses, and mica, used as a substitute for window glass, are common productions. Salt is found in great abundance on the steppes, and on the sur-

face of some of the lakes, where the heat of the sun in summer rapidly evaporates the water and leaves the surface covered with masses of crystallized salt, sometimes 8 or 9 inches thick, and so solid that beasts of burden pass over as upon ice in perfect safety.—The climate of Siberia is exceedingly cold. At Ustyansk, at the mouth of the river Yana, in lat.  $70^{\circ} 55' N.$ , the mean annual temperature is  $4.89^{\circ} F.$  At Irkootsk, in lat.  $52^{\circ} 17' N.$ , 1,240 feet above the sea, the mean temperature is  $81^{\circ}$ ; in winter quicksilver freezes, and remains so for about two months. The severity of the climate increases toward the E. At Nijni Kolymsk, at the mouth of the Kolyma, in lat.  $68^{\circ} 31'$ , long.  $160^{\circ} 56'$ , and nearly on a level with the sea, the river becomes frozen over in the beginning of September, and is not again free from ice till the beginning of June. The sea begins to freeze in October, but the cold at this time is somewhat diminished by vapors which rise from it before the ice forms. In January the thermometer falls to  $32^{\circ}$  below zero, and respiration becomes difficult. The cold is almost as great in February, but in March it begins perceptibly to decrease; the wind blows from the E. S. E., and the temperature rises to  $29^{\circ}$ . In June it is sometimes  $72^{\circ}$  at noon; and in July the heat is very great, and the atmosphere is filled with swarms of gnats, which compel the reindeer to migrate from the forests to the open country on the shores of the sea. In August frosts begin at night and the temperature rapidly decreases.—The reindeer is found on the mountains which separate Mongolia from Siberia, and also throughout the N. part of the country. The elk inhabits the south, and the roebuck as far as lat.  $55^{\circ}$ . The Caspian antelope is found in the S. W.; and wild sheep in the mountain range which forms the S. boundary. The black and arctic or stone fox are found in the N. Sables, ermines, marmots, martens, and squirrels abound in the S. The white bear, the lynx, the wolf, the wild hog, and the glutton are common everywhere. The dog of the country bears a strong resemblance to a wolf, and is used to drag sledges. The animals which belong to central Asia are nearly all found in greater or less numbers in the S. part of Siberia. Camels are kept by the Calmucks and some other tribes, but do not live N. of lat.  $55^{\circ}$ . The domestic sheep are of two species, the Russian and the broad-tailed Kirgheeian; the latter are chiefly kept by the nomadic tribes, single herdsmen of whom sometimes possess flocks of 10,000 head. The horned cattle of Russia when removed to Siberia degenerate in size. The horses are good, and generally white, but sometimes they are singularly marked. Fish are very numerous on the coasts and in the rivers and lakes. Ducks, geese, swans, woodcocks, partridges, and other fowl abound in the S. part of the country.—The population of Siberia is composed of various tribes and races. More than half are Russians or their descendants, some of whom

came to the country as voluntary immigrants, but the greater part were sent as exiles. These exiles consist of three classes, criminals and political and religious offenders. The worst class are condemned to the mines, and those whose offences have not been so great are employed at less laborious work, while the rest are formed into settlements under the supervision of the police, and receive grants of land for cultivation. None except the worst criminals are sent to Siberia without their families. Among the native tribes are the Samoyedes in the N. W., and the Ostiaks, who occupy the country to the S. of them as far E. as the river Yenisei; these people live by fishing and hunting, and but few of them have been converted to Christianity. In the S. W., beside some hordes of Bashkirs, are the Kirgheez, occupying the steppes of the Ishim and Irtysh, commonly called from them the Kirgheez steppes; these people are still in a barbarous state. Among the inhabitants of the W. parts of the Altai mountains the most numerous are the Calmucks, who have become partially civilized and laid aside many of their national peculiarities; they manufacture iron and gunpowder, and cultivate some grain and tobacco, but their chief subsistence is drawn from their flocks and herds. Their religion is made up of various superstitions. On the slopes of the E. part of the Altai range there are several tribes known as Beruisses, Beltires, Sagai, and Katchines. The Buriats are of Mongol origin, bear a strong resemblance to the people of N. China, and are the most numerous tribe in Siberia; they are found chiefly about Lake Baikal and E. to the river Onon, a tributary of the Amoor. The Tunguses are distributed over the country between long.  $110^{\circ}$  and  $170^{\circ} E.$ , from the shores of the Arctic ocean as far S. as the Upper Tunguska in the W., and further E. to the frontiers of China. They are well formed, and have made such advances in the mechanical arts as to manufacture their own firearms. They subsist chiefly by hunting, and are excellent horsemen. The Yakoots, who are found throughout the same region as the Tunguses, rear large numbers of horses and cattle, and live chiefly by the produce of their herds, those of a single individual often amounting to several thousand head. They are of Tartar origin, and have made considerable advances in civilization; some of them profess Christianity, and they pay attention to the education of their children. The peninsula formed by the Arctic ocean and the sea of Okhotsk is occupied by the Tchouktchis, who belong to the Esquimaux family. They consist of two tribes, one of which is nomadic and occupies the interior, where they keep herds of reindeer and live on their produce; while the other inhabits the sea shores and finds subsistence by fishing, and occasionally by hunting. South of the Tchouktchis live the Coriaks.—The manufactures of Siberia are not extensive, and are confined to a few places. They consist chiefly of earthenware,

glass, hardware, and leather; and there are a few woollen and linen factories where the labor is chiefly supplied by exiles. An extensive transit trade is carried on through Siberia between European Russia and China, and also in the produce of the country, consisting of skins, furs, cattle, fish both dried and salted, caviar, soap, and tallow. Kiakhta is the sole entrepot of the commerce between the two empires. In 1857 the exports to China amounted to \$4,772,735, and the imports from that country to \$5,892,555. The former consisted chiefly of cotton and woollen cloths, linen, furs, gold and silver articles, and leather; and the latter of tea, both leaf and compressed in cakes, sugar, silks, cottons, wool, grain, dried fruit, and colors. This trade has been chiefly carried on by means of the rivers which flow into Lake Baikal, thence through the Upper Tunguska to Yeniseisk, thence after a land carriage of about 40 m. passing through the Ket, the Obi, and the Irtysh to Tobolsk, whence there is again a land conveyance of about 500 m. across the Ural mountains to Perm. In winter, when the rivers are closed by ice, this traffic is maintained by means of sledges drawn by reindeer or dogs. But recently the tendency of the trade has appeared to be to take the sea route by the coast of China to Nikolaieff, and thence up the Amoor by steamboat. There is also a considerable caravan trade with Ili, Tashkend, Khokan, &c. A great deal of the trade of the country is transacted at fairs held at stated periods, which are attended by crowds of dealers from all quarters. The most important of these fairs are at Obdorsk near the mouth of the Obi, Turukhansk on the Yenisei, Ustyansk on the Yana, and Ostrovnoye on a tributary of the Kolyma.—Genghis Khan conquered a part of Siberia, and his successors reduced the country lying on both sides of the Irtysh to their authority. Nothing was known in Europe concerning this vast territory till 1580. In that year Yermak, a Cossack chief, while retreating from the just vengeance of the czar of Moscow, crossed the Ural mountains and entered Asia with a strong band of followers. These adventurers made extensive conquests, which the chief offered to the czar on condition that he would pardon his former crimes. This offer was gladly accepted, and he continued to push his conquests E. till stopped by death in 1584. Russia afterward continued the warfare till the whole country W. of the Obi was subdued. The town of Tomsk was founded in 1604, and it became an important depot from which new expeditions were sent forth. In 1614 the surrounding tribes rose against the Russians, and laid the country waste to the gates of the town, which they besieged. European Russia was in great disorder at the time, caused by the civil wars which preceded the accession of the present royal family to the throne, and no succor could be sent to the besieged. The inhabitants however defended themselves with great courage;

and the Kirgheez afterward in despair left that part of the country and emigrated further W. After this, though the Russians occasionally met with serious reverses, their progress was rapid, and they reached the sea of Okhotsk in 1639. Irkutsk was founded in 1661. The wars by which Russia conquered Siberia were entirely carried on by private adventurers at their own cost, who were incited to the undertaking by their love of plunder. A Pole and some other exiles escaped from Yeniseisk and built a small fort on the Amoor; but having quarrelled with the Tunguses, they offered the conquest to the emperor of Russia, and begged forgiveness for their former offences; while the Tunguses about the same time applied to the emperor of China for assistance. This led to disputes between the two governments, but war was prevented, and the boundary between China and Siberia established by a treaty concluded at Peking in 1689. A second treaty was made in 1727, confirming the former and confining commercial intercourse to Kiakhta and Maimatchin. Since that time the population of Siberia has received a large and almost continual increase from the transportation thither of hosts of prisoners of war and political offenders, especially Poles.—See Atkinson's "Oriental and Western Siberia" (8vo., London, 1858).

SIBLEY, a S. co. of Minnesota, bounded S. E. by the Minnesota river; area, 650 sq. m.; pop. in 1860, 3,609. The surface is undulating and the soil fertile. Lake Minnetonka, 30 m. in length, is in this county. Capital, Henderson.

SIBLY, MANOAH, an English clergyman, born in London, Aug. 20, 1757, died there, Dec. 16, 1840. Before he was 19 years old he was a teacher of Greek, Latin, Hebrew, and Syriac, and published a "Critical Essay" on the Hebrew text of Jeremiah xxxiii. 16. In order more easily to obtain books for his own use, he became a bookseller, in which occupation he continued till in 1797 he obtained a situation in the bank of England, which he held during the rest of his life, being for the last 25 years principal of the chancery office. In 1787 he became acquainted with the writings of Swedenborg, and embraced the doctrines of the New church; in the following year he began to preach to a society meeting in Great Eastcheap, and was ordained in 1790. For 58 succeeding years he preached every Sunday. A large number of his sermons were published at the request of the congregation, and he also published a volume of hymns, most of which he composed to suit his discourses. He was one of the editors of the "Aurora," and was a contributor to various other periodicals of his church, with whose early progress in Great Britain his name was prominently connected.

SIBOUR, MARIE DOMINIQUE AUGUSTE, a French prelate, born at St. Paul-Trois-Châteaux, Drôme, April 4, 1792, assassinated Jan. 8, 1857. He was educated at Avignon and at Paris, became professor in the seminary of St. Nicholas du Chardonnet, in 1817 vicar to

the parish of the *missions étrangères*, in 1818 to that of St. Sulpice, afterward canon of the church of Nîmes, in 1838 vicar-general of that diocese, and in 1840 bishop of Digne. Animated by liberal ideas, he published his *Institutions diocésaines* (2 vols., Digne, 1845), in which he demanded for the chapters a larger share in the government of the dioceses, and for the inferior clergy guaranties of independence. In 1848 he was made archbishop of Paris, where, without concealing his democratic ideas, he labored to reconcile the extreme parties. He also established numerous schools, and gave a decided impulse to the study of theology. In 1852 he was made a senator, and in 1854 created an officer of the legion of honor. In 1857 he was opening the *neuvaine* of St. Genevieve at the church of St. Etienne du Mont, when he was killed with a poniard by a priest named Verger, whom he had recently suspended. The criminal pretended that he wished to punish the adhesion of the archbishop to the new dogma of the immaculate conception.

SIBYL (Gr. *σιβυλλα*), a name applied to several prophetic women who belong to the mythical period of ancient history. The number is variously given by different authors, some limiting it to 4, while others mention as many as 10 sibyls, viz.: the Babylonian, the Libyan, the Delphian, the Cimmerian, the Erythræan, the Samian, the Cumæan (who is sometimes identified with the Erythræan), the Hellespontian or Trojan, the Phrygian, and the Tiburtine. They were supposed to have knowledge of the future, and of the means of averting calamities and of appeasing the wrath of the gods, and are generally described as travelling from country to country, communicating to men their inspired wisdom. The most famous of all was the Cumæan sibyl, so called from Cumæ, her residence in Campania, whither she is said to have come from the East, and of whom Virgil makes copious mention in the *Æneid*, book vi. According to the ancient Roman legend, this woman (or, as some suppose, the Erythræan sibyl) appeared before Tarquin the Proud and offered him 9 books for sale. Upon the refusal of the king to purchase, she retired, burned 3 of the books, and returning to the royal presence demanded the same price for the remaining 6 that she had asked for the 9. The king again refused, and having burned 3 more of the books, she offered him those that remained, but with no abatement of the original price. The king, either through curiosity or superstition, purchased the 3 remaining books, and the sibyl vanished. The volumes thus mysteriously obtained were the famous sibylline books, so intimately connected with the religious and political history of the Roman people. They were preserved in the temple of Jupiter Capitolinus, under the care of certain officers, originally 2 in number (*duumviri*), but afterward increased to 10 (*decemviri*), and finally to 15 (*quindecimviri*), who alone had the privilege of inspecting their contents on the

direction of the senate. They were consulted chiefly in times of public calamity, but of the nature of their contents no definite idea can be derived. Niebuhr is of the opinion that their revelations referred less to future events than to the kind of worship required by the gods, when they had manifested their displeasure by prodigies or national calamities. The books probably consisted of bundles of palm leaves on which the prophetic sentences were written, and, when consulted, were opened at random, the first passage that met the eye being considered that intended for present use. The sibylline books having been consumed in the fire which destroyed the temple of Jupiter Capitolinus in 82 B. C., a new collection was compiled by ambassadors sent to the various sibylline oracles in Italy, Greece, and Asia Minor, and was deposited in the temple of Jupiter after it was rebuilt. In the reign of Augustus more than 2,000 spurious prophetic books of this description, which had accumulated in private hands, were, at the command of the emperor, delivered to the *prætor urbanus* and burned, and those in the custody of the state were preserved in two gilt chests in the temple of Apollo on the Palatine hill. A revision of the latter was made by Tiberius, and many passages supposed to be spurious were stricken out. On 3 subsequent occasions the sibylline books were burned and again restored.—A portion of the apocryphal Christian literature early received the title of "Sibylline Oracles," 8 books of which are still extant. They were gradually collected after the 2d century, and contain a heterogeneous mixture of heathen, Jewish, and Christian poems, the Christian commencing prior to A. D. 100 and receiving additions till the 5th century. An edition of the sibylline books was published by Gallæus in 1689 (4to., Amsterdam), and fragments have been edited by Angelo Mai (Milan, 1817) and Struve (Königsberg, 1818).

SICARD, ROCH AMBROSE CUCURRON, abbé, a French philanthropist, born at Fousseret, near Toulouse, Sept. 20, 1742, died in Paris, May 10, 1822. He was educated at the university of Toulouse, and entered holy orders there. The archbishop of Bordeaux having appointed him teacher in his projected institute for deaf mutes, he placed himself under the instruction of the abbé de l'Épée at Paris, to acquire his method of teaching. In 1786 he returned to Bordeaux and opened the school, which soon attained a higher reputation than the parent one at Paris. He was then appointed vicar-general of Condom and canon of Bordeaux, and elected a member of several literary and scientific societies. In 1789, on the death of the abbé de l'Épée, he was appointed his successor, and entered upon his duties at Paris in April, 1790. Though Sicard had taken the oath of allegiance to the assembly, his former church preferments caused him to be suspected, and on Aug. 28, 1791, he was arrested and imprisoned, and would have been guillotined on Sept. 2 but for

the interposition of a watchmaker named Monnot, who declared that he was a benefactor to the human race, and that they must kill him before they should touch a hair of Sicard's head, and for the extraordinary exertions of his friends in the assembly. In 1795 the national convention established a normal school, and appointed Sicard a teacher of grammar. He was very successful, and drew to his lectures many of the more eminent literary men of Paris; but his strictures upon the administration in the *Annales religieuses* drew down upon him the wrath of the directory, who banished him; and it was only after the lapse of several years, and the most humiliating submissions, that he was restored to his old post. He found the children scattered and the school at a very low ebb, but in a few years made it the best institution for deaf mutes in the world. He improved De l'Épée's method by the addition of signs for metaphysical ideas (see DEAF AND DUMB), and greatly enlarged the sphere of mental culture possible to deaf mutes. In 1815 he visited England, taking with him his pupils Massien and Clerc; and while there he met Mr. Gallaudet, then seeking to qualify himself to commence deaf mute instruction in the United States. (See GALLAUDET.) Sicard's old age was spent in poverty, he having lost all his property by becoming security for some friends. His principal published works are: *Théorie des signes*; *Cours d'instruction d'un sourd-muet de naissance*; and *Éléments de grammaire générale, appliquée à la langue Française*.

**SICILIES, THE TWO** (Ital. *Regno delle Due Sicilie*), formerly an independent kingdom under princes of the house of Bourbon, now a part of the new kingdom of Italy under Victor Emanuel II. It consists of the southern part of Italy, commonly styled the kingdom of Naples, and of the island of Sicily, separated from each other by the strait or Faro of Messina, extending from lat. 36° 38' to 42° 55' N., and from long. 12° 25' to 18° 30' E.; area, 43,753 sq. m.; pop. in 1856, 9,117,050. (See SICILY.) The continental part, comprising the most beautiful half of the Italian peninsula, is by far the larger of the two, having an area of 33,037 sq. m. Its divisions, population, and chief towns are as follows:

Provinces.	Pop. in 1856.	Chief towns.	Population.
Naples.....	855,722	Naples.....	418,920
Terra di Lavoro.....	774,523	Caserta.....	25,000
Abruzzo Ultra I.....	238,560	Teramo.....	13,000
Abruzzo Ultra II.....	335,653	Aquila.....	12,000
Abruzzo Citra.....	828,323	Chieti.....	14,000
Molise.....	351,212	Campobasso.....	9,000
Principato Citra.....	543,979	Salerno.....	18,000
Principato Ultra.....	875,313	Avellino.....	22,000
Capitanata.....	334,878	Foggia.....	24,000
Terra di Bari.....	545,252	Bari.....	27,000
Terra d'Otranto.....	481,949	Lecce.....	19,000
Basilicata.....	517,354	Potenza.....	12,000
Calabria Citra.....	456,018	Cosenza.....	9,000
Calabria Ultra II.....	393,584	Catanzaro.....	12,000
Calabria Ultra I.....	388,180	Reggio.....	18,000
Total.....	6,896,060		

It is bounded N. E. by the Adriatic, S. E. by

the Ionian, and S. W. by the Tyrrhenian sea, and N. W. by the Papal States. The sea coast has an extent of 1,184 m., almost equally divided among these 3 seas. The land frontier, which forms a winding line, running S. W. from the mouth of the Tronto on the Adriatic to a point near Terracina, N. of the gulf of Gaëta, on the Tyrrhenian sea, is about 185 m. long, while the direct distance between the two points mentioned is only 105 m. The length of the kingdom, from the Tronto to Cape dell' Armi, on the strait of Messina, is about 300 m.; its greatest breadth, on the parallel of 40° 30', is 200 m. between Cape della Campanella, the southern point of the gulf of Naples, and Brindisi on the Adriatic; while S. of this line the two parts of the peninsula, separated by the gulf of Taranto, become very narrow, and in some places are contracted to a breadth of only 20 and even 16 m. The coast along the Tyrrhenian sea, for the most part bold and rocky, presents headlands and indentations which afford a safe anchorage, but few good harbors for large vessels. The most northern bay is that of Gaëta, which opens in a wide curve and is commanded by the strong fortress of Gaëta; next comes the far-famed bay of Naples, the entrance to which is guarded on the N. by the islands of Ischia, Procida, and Nisida, and on the S. by the rugged rocks of Capri, while on its shores, beside the metropolis, are the towns of Baiæ, Pozzuoli, Portici, Castellammare, and Sorrento, as well as the ancient ruins, modern country seats, and gardens with which they are interspersed; then the vast opening called the gulf of Salerno, whose depth is 30 m., with cliffs on its N. and sandy beach on its E. side. From Cape della Licosa, the coast, after projecting the promontory of Palinuro, rounds eastward to form the smaller gulf of Policastro; then trends S. S. E. in a nearly straight line to that of Sta. Eufemia, which is bordered on the S. by the headland ending in Cape Vaticano; and winding S. W., comes near to the Sicilian shore, from which it is separated by the narrow strait of Messina. Being now washed by the Ionian sea, it rounds again to the E. from Cape dell' Armi to Cape Spartivento, the southernmost point of the peninsula, and thence running N. E. faced by steep rocks to Cape Rizzuto, forms the gulf of Squillace; then with a great curve it forms, between Capes dell' Alice and di Leuca, the wide gulf or rather inland sea of Taranto, which measures not less than 66 m. across, with its excellent port and large city of the same name at the N. end. Leaving now the Ionian for the Adriatic sea, and clearing Cape Otranto, the easternmost point of Italy, the coast runs semi-circularly N. W. to the gulf of Manfredonia, which is overlooked on the N. by the projecting mass of Monte Gargano, and finally clearing this heavy spur continues in its former direction to the mouth of the Tronto.—The Apennines, with their numerous ranges, offshoots, and valleys, form the most important feature in the

physical geography of the country. On entering the kingdom on the N. W. they divide into two lofty ridges, running separately S. E. to lat.  $41^{\circ}$  N. and long.  $15^{\circ} 15'$  E., where they unite again to form the central group of Termini. On both sides of these ridges are found a few extensive plains; that of Terra di Lavoro, around Naples, is the most celebrated for the richness of its soil, forming a part of what was called Campania Felix by the Romans; the largest, known as Puglia Piana or Tavoliere di Puglia, is situated on the E. slope of the Apennines, near the gulf of Manfredonia, but, being in part sandy and arid, is mostly appropriated to pasture. With these exceptions, the country generally consists of table lands and valleys, most of them no less remarkable for their picturesque beauty than their fertility. From Termini the chain bifurcates; the eastern range winds toward the shore of the Adriatic, to terminate at Capedi Leuca, frequently leaving but a narrow strip of land between its foot and the sea; while the western irregularly follows, with occasional depressions, the Tyrrhenian coast, and ends on the straits under the name of Aspromonte. In this division plains are wanting, and the ground is considerably broken; the slopes of the mountains are often barren, and the soil along the shore sandy or rocky. Entirely distinct from the Apennines, there exist groups of volcanic mountains, viz.: the Roccamonfina, near the gulf of Gaëta, between the Garigliano and the Volturno; the Phlegrean fields, N. of Naples; Mt. Vesuvius, a few miles S. E. of that city, the most celebrated of all, and the only one still active; and Mt. Vulture, on the E. slope, in the N. W. part of Capitanata.—The physical structure of this part of the peninsula does not admit of any large river. Among the numerous streams that rise from either side of the mountains, may be mentioned the Liri or Garigliano and the Volturno, with its branch the Calore, which, after watering the Terra di Lavoro, fall into the gulf of Gaëta; the Sele (anc. *Silarus*), which drains Principato Citra to the gulf of Salerno; the Crati, the Basento, and the Bradano, flowing into that of Taranto; the Tronto, the Pescara or Aterno, the Sangro, the Biferno, the Fortore, the Cervaro, and the Ofanto, into the Adriatic. The only lake of any size is that of Celano or Fucino, in Abruzzo Ultra; those of Fusaro, Averno, Anagno, and Licola, in the vicinity of Naples, are small, but historically important.—The climate is generally healthy, with the exception of such marshy districts as are subjected to the malaria. The temperature varies greatly according to the elevation of the land. In the mountain districts the climate is much like that in the Alps; the cold of winter is piercing and long continued. In the plains and valleys near those districts the air is bracing, but snow seldom falls, and melts rapidly. On the sea shores and in the lower parts of the country, the winter is so mild that vegetation is never interrupted; and at the S. extremity of the king-

dom tropical plants flourish in the open air. The E. slope is remarkably dry, rain very seldom falling along the Adriatic coast; during the summer the heats are oppressive, and the soil presents but a parched vegetation. On the W. slope, on the contrary, showers are frequent in summer, and the annual fall of rain averages about 29 inches. Sea breezes sometimes cool the atmosphere; but during the latter part of summer and the month of September the sirocco, or south wind, coming from the deserts of Africa, exerts its enervating influence, and the people, especially in the cities, are careful to avoid it.—Agriculture is the chief pursuit of the inhabitants; but with very few exceptions there is no systematic treatment of the soil, and the worst agricultural implements only are used. Although landed property has been more equally distributed since the abolition of feudal tenures by the French administration, and although good roads have been constructed during the last 40 years, the production of breadstuffs, except Indian corn, the culture of which has been extended, is inferior to what it was in the beginning of this century. Many land owners and farmers, discouraged by unprofitable labor and losses, sometimes leave their fields uncultivated, and are thus exempt from paying land taxes. The arable lands in the continental provinces are estimated at 20,220,516 acres, of which 11,430,972 only are under cultivation. The land is mostly occupied and worked by the proprietors, or held by tenants under a lease of some years' duration at a fixed rent; in some parts, however, it is let in small lots of 4 or five acres, on shares. Fields are generally planted with rows of poplars, elms, mulberries, and even vines, under whose shelter crops are raised without being injured by the parching sun. The more common kinds of grain are wheat and maize or Indian corn; the crop of the latter is estimated at 112,000,000 bushels, more than is required for home consumption, and might easily be increased tenfold. Rye is also extensively cultivated in some districts. Next to maize, olive oil is the most important agricultural production, the olive tree growing in all the low and temperate parts of the country, with scarcely any care. Both oil and olives are articles of exportation. The culture of the vine, instead of being the object of the undivided attention of experienced husbandmen, is generally carried on upon the same farm with that of other produce; so that most of the wines, except the sweet ones, are only suitable for being converted into brandy. Some provincial growths, however, are celebrated as having at once body and flavor; beside the *Lachrymæ Christi*, that red luscious liquor which appears only on princely tables, the *Pellagrello* of Piedimonte, the red and white *Gerace*, the red *Taranto*, the *Muscat* of Trani, the *Aleatico* of Bari, the *Capo di Lecce*, and the *Torre del Greco* deserve to be noticed. Much silk is produced, mostly for home consumption, a very small quantity being



exported; it is scarcely inferior to that of N. Italy. The cotton plant grows in many parts of the country, but the cotton gathered amounts to only about 80,000 bags. Flax and hemp are objects of more attention, but are produced in quantities scarcely sufficient for home manufacture. Vegetables and fruits of various kinds are abundant. In fact the soil is fitted for all the products of the temperate and some of the tropical zone. The licorice tree grows in Calabria and the Abruzzi, and about 15,000 *cantari* of juice are yearly exported. Manna is also a product of importance in Calabria; the gathering of it is farmed by the government. Almonds, chestnuts, and figs are plentiful; and the last named especially, fresh or dried, beside being an article of exportation, are used as winter food by the lower classes. The forests of the interior could afford abundance of timber admirably adapted for ship building; but the jealous care of a despotic government and the want of roads and means of conveyance have until lately prevented any profitable use of that source of wealth. With the exception of sheep, the number of domestic animals is comparatively small; there are estimated to be 4,700,000 head of sheep, 720,000 goats, 860,000 oxen and cows, 50,000 buffaloes, 110,000 horses, 890,000 mules and asses, and 2,400,000 pigs. A great number of the sheep are migratory, being kept on the mountains in summer and driven in winter into the valleys, and especially the *tavoliere* of Apulia. The wool crop, which is gathered twice a year, is abundant, mostly of good quality, and is largely exported. The oxen, some of which are of splendid breeds, are used both for the plough and for carts. Buffaloes also serve as beasts of draught. The horses are but indifferent; the Calabrian breed, however, though small, is remarkable for activity. The milk of the goats is converted into cheese, which is an important article of food among the people.—Next to agriculture, the fisheries are the chief source of occupation to the inhabitants. The tunny, which frequents the W. coast in large shoals, is caught in great abundance in May, June, and July; and the sword fish is taken in its migration toward the Black sea, about the vernal equinox. Anchovies and sprats are taken in shallow waters during the months of March, April, and May; they are salted and put up in barrels of about 200 lbs. each, for home consumption and exportation. Several parts of the coast swarm with sole, white smelt, mackerel, sturgeon, and red and gray mullets; the roes of the last are made into *botarga*. Testaceous and crustaceous fish also abound, among which are prawns of large size. But the quantity of fish taken for food, however great, is scarcely equal to the home demand. Beside the regular fisheries, a number of seamen, especially from Trapani and Torre del Greco, are employed in gathering coral, which is found at several places, but most abundantly on the African coast.—The mineral wealth of

the kingdom is still in great part undeveloped. Some mines of anthracite and petroleum are worked on a small scale in the Abruzzi. Iron ore is found abundantly in the Aspromonte range, and a few founderies and iron works have been established in Calabria. Quarries of marble are also worked, but, although of fine quality, the product has not yet found its way out of the kingdom. Some alum is gathered. There are beds of rock salt which might yield large returns, but are comparatively neglected, while large quantities are procured on the sea shore by evaporation, both for export and home consumption. The most important article of foreign trade in this department is the sulphur produced in Sicily.—Manufactures, with a few exceptions, are still in a state of infancy. Women, all over the country, spin flax, hemp, wool, and cotton, and weave coarse stuffs that are generally worn by country people; but some cotton mills and manufactories of woollen cloth, linen, cotton stuffs, and silk goods have been established, some of which are comparatively prosperous. Gloves and straw hats are also manufactured in the capital and some other places; a considerable glass manufactory exists at Posilippo. Hardware and cutlery are fabricated at Campobasso; earthenware, porcelain, leather, ropes, and cordage are also among the subordinate branches of manufacturing industry.—Neither the domestic nor the foreign trade has ever been in a condition of healthy activity; ordinary facilities are wanting, such as institutions of credit as well as the means of transportation at home, and a tariff that would encourage intercourse with other nations. The only public establishments of a financial character are the *monti frumentarii*, which assist the farmers by furnishing them, on certain terms, with seeds and agricultural implements, and the *monti di pietà* or pawn-broking banks. According to the best authorities that can be procured, the mercantile marine in 1855 amounted to 8,988 ships of an aggregate of 212,965 tons, which showed a considerable increase for the previous 21 years, as in 1834 the number of vessels was but 5,493, and the tonnage 169,330. In 1856 the imports of the continental provinces were estimated at about \$16,163,930, and the exports at \$13,229,750, giving a total of \$29,393,680. The imports consisted principally of cotton and cotton yarn, sugar, woollen manufactures, tobacco, and coffee; the exports of oil, Indian corn, wheat, silk, madder root, wool, almonds, and dried and fresh fruits. Naples is the chief emporium for domestic and foreign trade; but the latter is shared by Castellamare, Reggio, Taranto, Gallipoli, Bari, Molfetta, Barletta, Manfredonia, and Termoli.—Until the year 1860, the government of the Two Sicilies was an un-mixed absolute monarchy. The king governed through his cabinet, consisting of 10 secretaries of state, under the presidency of a premier, one of them having especial charge of the administration of Sicily. These were assisted by a

council general of the kingdom, divided into two chambers, one of 16 members for the kingdom of Naples, the other of 10 for Sicily; and also by a kind of privy council, known as *consiglio di stato*, with an unlimited number of members, who met when summoned under the presidency of the king himself or the heir apparent. Each province had a governor or *intendente*, having the civil, military, and financial administration in his hands, assisted by a *consiglio d'intendenza* in his official duties, and by a *consiglio provinciale*, consisting of landed proprietors, whose only functions were to suggest any improvements that might be beneficial to the province. These, as well as all the subordinate officers of the districts, cantons, and communes into which the provinces were divided, were directly appointed by and wholly under the control of the royal government. The judiciary, organized according to a decree of 1817, comprised two supreme courts, one sitting at Naples, the other at Palermo; 7 civil courts of appeal, 4 of them on the continent at Naples, Aquila, Trani, and Catanzaro, and 3 on the island, at Palermo, Messina, and Catania. There was also a court of original jurisdiction and a criminal court in the chief town of each province; a police court in each canton, and a justice of the peace in each commune or parish. All the judges were of course appointed and removable at pleasure by the king. In some places there were tribunals of commerce, and in the seaports admiralty courts; for certain particular crimes a "grand special court" was summoned, and there was also a high military court. The only religion allowed a free exercise was the Roman Catholic; there were, however, 7,500 Albanese belonging to the United Greek communion, and about 2,400 Jews were also tolerated, but only in the capital. The Catholic clergy consists of 22 archbishops, 19 on the continent and 3 in Sicily, of whom those of Naples, Capua, and Palermo are entitled, on their promotion, to a cardinal's hat; 85 bishops, 72 on the continent and 13 in Sicily; 5 *abbates*, and about 100,000 priests or monks. The monastic and mendicant orders had been partially suppressed in 1807, but were restored in 1815 by Ferdinand I. There is in every diocese a seminary for the education of young men intended for the church. Public instruction under the late government was in a very low state. The elementary schools that were organized under the reign of Joachim Murat had been either closed or neglected. Of the 4 universities, at Naples, Palermo, Catania, and Messina, the first may still boast of some celebrated professors; but pupils from the provinces were seldom allowed to resort thither, being obliged to graduate in their provincial institutions. Beside 8 academies, there are 22 colleges, one in each province, all of which were formerly superintended by Jesuits or other clergymen. The superintendence of the whole system was vested in two boards, one at Palermo, the other at Naples, each consisting of 6

members appointed by the king from among the professors, under the presidency of a bishop, and both boards were under the direct control of the minister of public education.—On Jan. 1, 1859, the military establishment, including the reserve, the marines, and the veterans, numbered 2,825 officers and 96,805 soldiers, of whom about 14,000 were Swiss mercenaries, and 8,843 horses. The effective part consisted of 2,509 officers, 80,029 soldiers, and 8,543 horses. The men from 18 to 25 were drafted by conscription; there was no exemption from service, but every one could buy a substitute by paying \$200 to the government. The time of service was 5 years in the infantry, and 8 years in the cavalry, artillery, or gendarmerie. The Swiss were enlisted by virtue of a stipulation entered into in 1827. The navy had of late years been increased and much attended to; in 1854 its *personnel* consisted of about 140 officers, 7,400 marines, and 5,000 sailors. The sailing vessels were 2 ships of the line of 80 guns each, 5 frigates of 40 to 60 guns, 2 corvettes of 22 guns, 5 brigs of 18 and 2 sloops of 14 guns, and a steam squadron of 23 vessels, varying from 200 to 400 horse power each, forming an aggregate of 5,304 horse power and 110 guns.—In the absence of any regular budget, the financial condition of this kingdom is partly a matter of conjecture. On the restoration of Ferdinand I. (or IV. of Naples) the funded debt, at 8 per cent., was \$22,586,730. The events of 1821 and 1848 swelled it so that in 1859 it amounted to \$98,324,600, most of the new stock being at 5 per cent. At the same period, the public revenue, accruing from the land tax, public domain, excise, indirect taxes (such as customs, lottery, &c.), and other sources, was estimated at \$25,656,190, while the expenditure amounted to \$26,187,700, thus leaving a deficit of \$531,510. The collection of the revenue took about 15 per cent. of the amount, the interest on public debt 18 per cent., and the army and navy combined nearly 45 per cent., viz.: \$9,460,000 for the former, and \$1,805,000 for the latter. Public works took less than \$1,600,000, of which \$600,000 was for prisons and dungeons; and public instruction \$286,000, including the keeping of the Museo Borbonico, public libraries, the institute of arts, and the allowance for theatres and public spectacles, which was \$58,000. The fall of King Francis II., brought about by the invasion of Garibaldi, has in great part overthrown the governmental fabric; the two divisions of the kingdom are now each under the control of a "lieutenant of the king," appointed by Victor Emanuel, while deputies are sent by the people to the Italian parliament at Turin. These lieutenants, who are assisted by a "lieutenancy council," have preserved in part the administrative organization, until it can be improved; but the judiciary system has been remodelled on that of Piedmont, while the Sardinian penal code and code of procedure have been enforced since July 1, 1861. The religious changes that

had taken place in Piedmont have been introduced here; the Jesuits have been expelled, and the property of the convents has been sequestered. The army has been disbanded and is in process of reorganization on a new plan; for the present it consists merely of such officers and troops as were appointed and enlisted by Garibaldi. All the garrisons are held by soldiers from the north of the peninsula. The disordered state of the country and the guerilla war which the last partisans of the Bourbons are waging, especially in mountain districts, render it very difficult to collect taxes; a deficit of over \$10,000,000 is anticipated for the present year (1861), and trade and agriculture are paralyzed by the troubles. The new government is energetically struggling against all these difficulties, and gives especial attention to the neglected public works. But two insignificant railroads are in existence, both running from Naples, one to Vietri and the other to Capua. Both are so ill constructed that they must be rebuilt, and the latter will be continued to Ceperano, on the frontier of the Papal States; on this from 4,000 to 6,000 workmen are engaged.—The early history of the peninsular part of the country, which in ancient times comprised the provinces of Bruttium, Lucania, Calabria, Apulia, Samnium, Campania, and a part of Latium, is closely connected with the history of Rome, and through the Magna-Græcian cities of Tarentum, Croton, Sybaris, Thurii, Rhegium, Neapolis, and others, partly also with that of Greece. After the fall of the western empire the country was successively under the power of the Goths, the Byzantine exarchate of Ravenna, and the Saracens; but a number of small republics or duchies, as Naples, Salerno, Amalfi, Gaëta, and Benevento, ultimately rose to independence. Great numbers of Norman adventurers, during the first half of the 11th century, served these small states as mercenaries, but soon began to wage war on their own account; and under the leadership of William Bras de Fer, Drogo, and Robert Guiscard, they conquered the greater part of Apulia, which they divided into 12 counties, each having its own lord, and forming together a feudal confederation. In 1053 Pope Leo IX., at the head of German and Italian troops, tried to expel the new conquerors; but he was defeated at Civitella and taken prisoner, but treated with the utmost respect by his captors, who obliged him to recognize their conquests by formally holding them as vassals of the holy see. Robert Guiscard established his power paramount over his companions in arms, assumed the title of duke of Apulia, and subdued Calabria, while his youngest brother Roger made himself master of the island of Sicily, previously occupied by the Saracens. In 1127 the whole of the Norman acquisitions were united under Roger II., son of Roger I., the conqueror of Sicily, who received in 1030, from the anti-pope Anacletus II., the title of king of Sicily and Apulia. The bull which

conferred that dignity clearly established the paramount lordship of the pope, and stipulated the annual tribute to be paid by the new kingdom. Roger, after receiving at Palermo his crown from a cardinal sent for that purpose by the holy father, conquered the principality of Capua and the duchy of Naples, thus extending his possessions to the present northern frontier. He was succeeded in 1154 by his son William I. the Bad, who soon left his crown to William II. the Good (1156-'89); the latter, the best of princes, while securing the prosperity and happiness of his people, proved a staunch supporter of Pope Alexander III. and the cities of Lombardy against the emperor Frederic Barbarossa. William II. dying without issue, his kingdom was claimed by his aunt Constance, who had married the son of Barbarossa. Henry VI. upheld his wife's rights against the usurper Tancred, and finally in 1195 united the kingdom of Naples and Sicily to the empire. On his premature death in 1197, his Italian crown passed to his son, afterward the emperor Frederic II. The exertions of this prince to annihilate the Lombard league and to strengthen his dominion over Italy drew upon himself and his descendants the persecution of the papal court. The popes improved the minority of Conradin, his grandson, to seize upon the kingdom. Manfred, a natural son of Frederic II., first regent for his nephew Conradin, then king on the pretended death of this young prince (1258), became the special object of papal hatred. Urban IV. and Clement IV. excommunicated him and offered his crown to several princes; the offer was greedily accepted by Charles of Anjou, count of Provence, the youngest brother of Louis IX. of France, who received the investiture, on condition that he should do homage to the holy see for his kingdom and pay an annual tribute of 8,000 ounces of gold. Charles, after being crowned at Rome, marched against Manfred, at the head of an army mostly consisting of crusaders, who had answered the call of the pope against the "infidel usurper;" he defeated and killed his competitor in 1266 at the battle of Grandella, near Benevento, which was soon followed by the subjugation of the two kingdoms. The lawful heir, young Conradin, two years later, supported by German and Italian troops, presented himself to vindicate his rights; but he also was defeated, Aug. 25, 1268, at Palenta, near Tagliacozzo, taken prisoner, and decapitated at Naples, Oct. 29, by order of the conqueror. The tyranny of Charles weighed heavily upon the Italians; and the hatred of the oppressed rose to such a pitch that Sicily shook off the yoke; the massacre known as the "Sicilian vespers" took place at Palermo, March 30, 1282; and within a month all the French were either slaughtered or expelled from the island, which acknowledged as its king Don Pedro III. of Aragon, the husband of Constance, Manfred's daughter. Vainly did Charles of Anjou try to regain pos-

session of Sicily. For more than a century and a half the island and the continental kingdom were separated from each other, the sovereigns of both parts however styling themselves kings of Sicily. The destinies of the house of Anjou at Naples, obscured during the later years of Charles I. and the reign of his son Charles II. the Lame, brightened again under Robert the Wise (1309-'43), who proved himself a patron of literature and the fine arts; but the reign of his daughter, Joanna I., was marked by all sorts of domestic crimes and disorders. On her death in 1382, a bloody contest raged between Louis I., the head of the second house of Anjou, her adopted son, and Charles of Durazzo, her lawful heir. The latter finally triumphed, but was murdered in Hungary in 1386. His young son Ladislas, scarcely 10 years old, was overthrown by the Angevine party, who called in Louis II. of Anjou in 1389; but 10 years later he reascended his throne, became also king of Hungary in 1408, and improved his power to crush the adherents of his rival. He was succeeded in 1414 by his sister Joanna II., whose reign of 21 years was as shameful and disastrous as that of Joanna I. After adopting in succession Alfonso V. of Aragon and Louis III. of Anjou, she finally bequeathed her crown to René, brother of the latter. But after a few years' war, René, deserted by his friends, without troops or money, was expelled by Alfonso V., who received the investiture of his new kingdom from Pope Eugenius IV., and thus reunited the two parts of the old monarchy. This however did not last long, as on his death in 1458 he left the kingdom of Naples to his natural son Ferdinand I., who had hard work to protect his rights against John of Calabria, son of King René, while Sicily as well as Aragon fell to the lot of his brother John II. The bastard line of Naples, after being deprived for a while of their kingdom by the sudden conquest of Charles VIII. of France in 1494, were finally in 1503 robbed of their possessions by Ferdinand V. of Aragon. Through his general Gonsalvo de Cordova, he treacherously seized the chief cities of his cousin Ferdinand III. and expelled the French, who, by virtue of the secret treaty of Granada, claimed a share in the spoils. He received the investiture of his conquest from the pope in 1504, and from that period to the beginning of the 18th century the kingdom of the Two Sicilies was but a part of the Spanish empire. Under the emperor Charles V. a strong administrative system was organized, and a viceroy was invested with full powers of government. This functionary, as well as his successors, aimed at keeping the Italians and Sicilians in submission, while increasing as much as possible the taxes, in order to send large remittances to the king, who was always in want of money. Such exactions went so far under Philip IV. as to excite rebellion (1647) both in Sicily and on the continent. This was easily smothered in the island; but the rising

at Naples, under Masaniello, proved more formidable; vainly was the fisherman assassinated by emissaries of the viceroy, the duke of Arcos; he was succeeded by the gunsmith Genaro Annese, and other popular chiefs, and for about 4 years the contest went on with varied success; but finally the Spaniards conquered, and the Neapolitans were kept under their iron rule. During the war for the succession of Spain, they sided with Philip V., the Bourbon king; but in 1707 they were forced by the imperial troops to acknowledge as their sovereign Archduke Charles of Austria, whose title to the kingdom of Naples was made good by the treaty of Utrecht, while Sicily was by the same instrument given to Duke Victor Amadeus of Savoy. In 1720 this island was exchanged for Sardinia, and it was again reunited to the continental part, under the Austrian king Charles III., who was at the same time emperor of Germany as Charles VI. In 1734 the Spanish infante Don Carlos, son of Philip V. by Elizabeth Farnese, at the head of an army invaded Naples, defeated the imperial troops at Bitonto, May 25, conquered both the continental part and Sicily, and was crowned at Palermo, July 3, 1735, as Charles IV. This change was sanctioned by the treaty of Vienna, Nov. 8, 1738, and till 1860 the house of Bourbon, with the exception of a few years, maintained possession of the Two Sicilies. When in 1759 Charles IV. was called to the throne of Spain by the death of his brother Ferdinand VI., who had left no issue, he published a "fundamental law" preventing the further reunion of this kingdom with Spain, and gave it up to his third son Ferdinand IV., whose long reign (1759-1825) was marked by great vicissitudes. This prince was but a tool in the hands of his wife, Maria Carolina, daughter of the emperor Francis I. and Maria Theresa; she disgraced herself and her husband by her dissolute life, while she proved a rash opponent of the French. Gen. Championnet, at the head of a French army, invaded the Neapolitan territory, forced the king and queen to retire to Sicily, took possession of the city of Naples, and there proclaimed the "Parthenopean republic," Jan. 25, 1799. The reverses of the French in Italy enabled Ferdinand IV. to return to his capital at the end of a few months; but he was again expelled from it Jan. 25, 1806, and Joseph Bonaparte was appointed by his brother Napoleon I. king of Naples. The new king failed to conquer the island, where Ferdinand IV., supported by the English, maintained his dominion. Joseph Bonaparte left Italy to become king of Spain, and was succeeded in 1808 by his brother-in-law Joachim Murat, who, although gaining some popularity among his subjects, never had a strong hold on their affection; he was at once deserted by a majority of them when in 1815, by his rash and somewhat treacherous policy, he lost his throne; and he scarcely found any sympathy when, in a foolish attempt to reconquer it, he forfeited his life, Oct. 13.

Ferdinand, through the help of Austrian troops, was now restored to the continental part of his dominions; he reentered Naples June 17, styled himself formally "Ferdinand I., sovereign of the united kingdom of the Two Sicilies," and resumed his wonted practice of despotism. But liberal opinions, which had spread during the late political revulsions, awoke in 1820; a manifestation, prepared by Gen. Pepe, broke out in the month of July; a new constitution, similar to that which had of late been adopted in Spain, was established; Ferdinand and his son, whom he had appointed his vicar-general, took their oath to abide by it, and a parliament was summoned. This bloodless and highly promising revolution was smothered by order of the holy alliance; 40,000 Austrians, under Gen. Frimont, crossed the frontier; Pepe was defeated at Rieti, March 7, 1821; the parliament received orders to disperse; Naples opened its gates to the Austrians; and Pepe, in company with some other revolutionary chiefs, had to fly for his life. All hope of constitutional liberty was gone, and persecution against such as were suspected of favoring it was rife. Francis I. (1825-'30) and Ferdinand II. (1830-'59) followed in the footsteps of Ferdinand I.; the least political disorder was severely punished, what remained of provincial liberties was abolished, and the people were kept in abject ignorance. In 1847, under the hopes inspired by the election of Pope Pius IX., revolutionary movements broke out in Sicily. Palermo rose in arms Jan. 12, 1848, and worsted the royal troops, who were confined in the citadel; the insurrection spread like fire through the island, and extended to the continent; the Sicilian insurgents drove the troops before them, and the citadel of Messina was the only place that remained in the power of the latter. The king, frightened by popular manifestations in and around his capital, changed his ministry, granted a constitution, Jan. 29, established universal suffrage, and placed Gen. Pepe at the head of an army that was to uphold the cause of Italian independence; but he secretly prepared the means of overpowering the revolutionists as soon as circumstances would permit, and for that purpose reinforced his Swiss troops. A rising at Naples, May 15, was quelled after several bloody encounters; the king followed up his success; Sicily, within a few weeks, was again in his power, Messina and Palermo, the former especially, seeing fearful executions; the army under Pepe, who was marching to support the king of Sardinia, was recalled, and the sworn constitution suspended. Many were the sentences of death against political leaders, and such as escaped the gallows were confined in prison. All was silent around the king, who by the merciless cannonades he ordered won the surname of Bomba. With the aid of his mercenary troops and the lazzaroni, whom he treated with marked favor, he was enabled to spend his latter years in comparative tranquillity; but his son, Francis II., while

following at first the same policy, failed to secure the same result. Sicily first claimed its independence, and Garibaldi resolved at once to bring aid to the insurgents. With a few hundred volunteers he embarked at Genoa, May 6, 1860, and, evading the Neapolitan cruisers, landed on the 12th at Marsala; the Sicilians flocked around him. He at once marched onward, routed Gen. Landi at Calatafimi on the 15th, and appeared on the 22d before Palermo, which was defended by 25,000 troops under Gen. Lanza. Fifteen days later, June 6, the Sicilian capital was surrendered. Meanwhile Francis II., yielding to the entreaties of his uncles and the French ambassador, tried to allay discontent among the Neapolitans by reestablishing the constitution of 1848, and to check the insurrection in Sicily by offering it a separate constitution and administration; but such grants and the pledges by which they were corroborated came too late. Garibaldi proceeded toward Messina, and after a brisk engagement at Melazzo, July 20, arrived before that city, which he entered on the 27th, a capitulation being signed by the Neapolitan Gen. Clary, who retired to the citadel. The king saw that Sicily was lost beyond recovery by the force of arms; but he still hoped he could propitiate the Neapolitans by liberal concessions, and prepared to oppose Garibaldi, in case he should attempt an invasion of the continent; his army amounted to 80,000 men, the fourth part of which was sent to Calabria, while his fleet cruised between Naples and Sicily; but neither his land forces nor his navy were to be relied upon, as many soldiers and even officers sympathized with the revolutionists, and were only awaiting the arrival of Garibaldi to desert their banners. The latter landed at Capo dell' Armi, near Reggio, Aug. 19, was joined during the night by most of his volunteers, worsted the troops that opposed him, and, either by his own victories or by local insurrections, found himself master of the southern part of the kingdom. Seeing that it was impossible for him to remain longer in Naples without imminent danger, the king resolved to fall back toward Gaëta with the regiments that proved still faithful to his cause, meanwhile protesting energetically against the invasion of Garibaldi and the scarcely disguised complicity of Victor Emanuel. He left his capital in the afternoon of Sept. 6, and the next morning Garibaldi made a triumphal entry, amid the enthusiastic applause of the people. After winning a last and dearly bought victory on the banks of the Volturno, he gave up his dictatorship and signed the proclamation by which the people of the Two Sicilies were summoned on Oct. 21 to decide upon their own destiny. An immense majority, 1,310,266 out of 1,420,000, voted for the annexation of the Two Sicilies to the new kingdom of Italy. The dictator resigned his powers into the hands of Victor Emanuel, without accepting the most trifling reward, and retired

to his island of Caprera. The two parts of the kingdom, and especially the continental one, are still in an unsettled condition. The old adherents of the Bourbon family have begun a guerilla war in several provinces; and robbery, under a political disguise, is very prevalent. Francis II. held his stronghold of Gaëta against the Italian army until Feb. 14, 1861, gaining some consideration by his personal courage in the defence of the city. He is now (Dec. 1861) in Rome, and has not yet given up the hope of a popular reaction or foreign intervention in his favor.

SICILY (anc. *Trinacria*, from its triangular shape, and *Sicilia*), the largest island of the Mediterranean sea, separated from the coast of Calabria by the strait of Messina, and now forming part of the kingdom of Italy, extending from lat.  $36^{\circ} 38'$  to  $38^{\circ} 18' N.$ , and from long.  $12^{\circ} 25'$  to  $15^{\circ} 35' E.$  Of the 3 sides of the island, the northern is 180, the south-western 171, and the eastern 113 m. in length; area, 10,715 sq. m. Its divisions, with their population and chief towns, are as follows:

Provinces.	Population in 1856.	Chief towns.	Population in 1856.
Palermo .....	541,826	Palermo .....	184,541
Messina .....	331,664	Messina .....	95,832
Catania .....	411,583	Catania .....	96,615
Noto .....	254,593	Syracuse .....	18,902
Caltanissetta .....	135,581	Caltanissetta .....	17,867
Girgenti .....	250,795	Girgenti .....	18,560
Trapani .....	202,279	Trapani .....	27,236
Total .....	2,281,020		

The coast has numerous indentations, the largest of which are the gulf of Castellamare on the N. W., the gulf of Patti on the N. E., and the bay of Catania on the E.; the best harbors are those of Palermo, Messina, Agosta, and Syracuse. The tides on the coasts are slight and irregular. Of the two principal currents of the Mediterranean, that from the Atlantic and that from the Black sea, only the first is felt upon the shores of Sicily, and in its set through the strait of Messina causes the whirlpool at the N. end, called by the ancients Charybdis.—The N. part of the island is generally high, the mountains in several places coming close to the sea; but in the opposite direction they recede to a considerable distance, and the coasts are of moderate elevation. The greater part of the surface is occupied by broken ground, and the interior is finely diversified. Mt. Etna rises to the height of 10,874 feet in solitary grandeur (see *ETNA*); and a range of mountains runs from Cape Peloro, the N. E. point of the island on the strait of Messina, to the S. W., following the coast to near Taormina, 30 m. from Messina, where it is joined by a chain from the W. which keeps much nearer the N. than the S. shore of the island, and sends off spurs to the coast in the former direction. The first chain, now called Peloric, was anciently known as Neptunius Mons. The second is now called Madonian, and was formerly known as the Nebro-dian, and perhaps as the Hermaean range. No

part of this chain rises above 6,200 feet, and in the W. it becomes much broken, some of the mountains being quite isolated. About half way across the island, a chain of great hills breaks off from the Madonian mountains, runs through the high plateau of Etna to the S. E., and is cut up by numerous and precipitous ravines, but sinks into a flat country as it approaches Cape Passaro, the S. E. point of Sicily.—The island is watered by numerous streams, the most important of which are the Alcantara and Giaretta or Simeto on the E. coast, the Salso, Platani, and Belice on the S. W., and the Termini on the N. They are nearly all mere torrents, dry or nearly so in summer, but swelling into floods during the seasons of heavy rains; and few of them are navigable even at their mouths. The lake of Lentini, near the E. coast, between Oatania and Syracuse, is the most extensive sheet of water in the island, being about 12 m. in circumference, but shallow and stagnant.—Sicily contains no strata corresponding to those of the silurian, the old red sandstone, the coal, or the new red sandstone formation; granite and limestone are found in some places, and near Etna a large tract is covered with volcanic products. Different kinds of fine stone are abundant, and amber is procured near Catania. Small quantities of argentiferous lead, quicksilver, iron, copper, and antimony are found; but they are seldom worked. The other minerals include various kinds of marble, alabaster, gypsum, asbestos, lignite, bitumen, petroleum, naphtha, emery, alum, rock salt, nitre, sulphur, agates, chalcedonies, and jaspers. By far the most important of the mineral products of Sicily is sulphur, which is one of its principal exports.—The climate is temperate and agreeable. The thermometer rarely rises higher than  $92^{\circ} F.$  and seldom sinks below  $36^{\circ}$ , and the mean annual temperature at Palermo is about  $64^{\circ}$ . The annual fall of rain is about 26 inches, nearly all of which falls during the winter months. In summer the weather is settled, but after the autumnal equinox it becomes for a time hazy and boisterous. There is often delightful weather in November and December, but in these months and early spring it is very uncertain. Thunder storms are both violent and frequent; and the sirocco, or S. E. wind, blowing for 3 or 4 days at a time, is very distressing in some parts of the island.—There are two kinds of level ground in Sicily. Of the first an example is found in the dreary wastes along the S. shore, where the limestone rock coming near the surface supports a scanty vegetation; and of the second in the fertile plains of Palermo, Catania, and Castellamare, filling up the curves of the mountains which recede from the sea. The hilly regions are varied with undulating slopes and bold crags, the former of which are clothed with forests of fine timber, or covered with excellent pastures. In the fertile plains cultivation is general, and although the mode is rude and careless, the

crops are often remarkable for their luxuriance; the most important are wheat, maize, barley, and pulse. Artificial grasses are grown to a small extent, and hemp is raised in the deeper and lower grounds. The vine and olive are extensively cultivated, and often intermixed. The other vegetable productions most deserving notice are barilla, cotton, sumach, saffron, manna obtained from a species of ash (*fraxinus ornus*), and the mulberry, which is extensively applied to rearing silkworms. Various kinds of fruit are abundant. The most valuable kinds of timber found in the forests are ash, oak, pine, elm, and chestnut. Cattle are not numerous, and generally much neglected. Sheep are extensively reared, but the breed is inferior, and in many places goats are preferred to them. Snakes are common in the plains, and wolves are found in the mountains.—The population is composed of a mixture of many races, but the Sicanians or Siculians seem to have been the aborigines. Greeks, Carthaginians, Romans, Vandals, Goths, Herulians, Arabs, and Normans afterward settled among them. The Sicilians are of light olive complexion, middle stature, and well made. The dialect spoken differs considerably from the Italian, many words and expressions from other languages having crept into it. The people are generally lazy, effeminate, and dissipated; but among the peasantry remote from the vices of the towns there are some sober and tolerably observant of the duties of domestic life. There are many Greeks in the island who adhere to their own religion, and nearly all the rest of the inhabitants are Roman Catholics. Education is greatly neglected, and the people show little inclination for intellectual pursuits.—The manufactures are of trifling extent, and are principally confined to the larger towns. Silk, woollen, linen, and cotton goods, generally of coarse descriptions, are made; and there are manufactures of leather, cordage, glass, and earthenware. Wine of good quality is made, the best being produced along the coast of the Faro or strait of Messina, or on Mt. Etna, at Syracuse, Castel-Vetrano, and Marsala. The roads of the interior are very bad, and trade suffers much in consequence. The fisheries of Sicily are the most productive in the Mediterranean. The principal exports are grain, fruit, wines and spirits, sulphur, oil, sumach, barilla, silk, licorice, and cream of tartar.—The first inhabitants of Sicily are supposed to have come from the continent of Italy. In the 8th century B. C. the Greeks drove them into the interior and established several colonies on the coast, of which Syracuse and Messana (Messina) became the most celebrated. The Carthaginians invaded the island and also established colonies, which were afterward united with Syracuse. During the first Punic war Agrigentum (now Girgenti) was the principal stronghold of the Carthaginians, but was conquered by the Romans, who subsequently obtained possession of the whole island. On the decline of that em-

pire Sicily was overrun by barbarians. About the middle of the 5th century the Vandals from Africa invaded and conquered it. In 535 Belisarius expelled them and reduced Sicily for the Greek emperor. The Arabs conquered the island in 827, and made it the seat of an emir, who resided at Palermo. They were driven out by the Normans in the 11th century, who established the feudal system, and united the island to Naples. (See SICILIES, THE TWO.)

SICKINGEN, FRANZ VON, a German warrior, born in the castle of Sickingen, the hereditary seat of his family, in Baden, March 1, 1481, died March 7, 1523. He devoted himself from youth to arms, and was so distinguished for his valor and generous qualities under the emperors Maximilian I. and Charles V., that many nobles and princes declared him worthy to wear even the imperial crown. With resources which enabled him to collect and march armies against princes, he devoted himself to the defence of the poor and oppressed, encouraged the reformation, and protected the scholars Reuchlin, Bucer, Ecclampadius, and Ulrich von Hutten. In 1513 he declared war against the council at Worms, and in defiance of the imperial ban fought against the duke of Lorraine, forced the city of Metz to pay 30,000 florins to him and his warriors, and laid siege to Mentz, when the quarrel was adjusted by the emperor. In 1521 he invaded Picardy, in France, with the count of Nassau. To Luther he offered an asylum in his castle, and protection against persecution. In 1522 a private dispute concerning vassals brought him into war with the archbishop of Treves. He raised an army of 12,000 men, and, notwithstanding the interdiction of the imperial diet, desolated the territories of the archbishop, but retired when the latter was supported by the elector of the Palatinate and the landgrave of Hesse. In the following year he was besieged in his castle of Neustall, near Landstuhl, was mortally wounded and forced to surrender, and died a few days afterward. He was one of the last nobles who maintained in Germany the right of private warfare.

SICKLE. See SCYTHE.

SICKLE-BILL. See OURLEW.

SICYON (now *Vasilika*), one of the most ancient cities of Greece, in the Peloponnesus, originally situated on a plain near the Corinthian gulf, but destroyed and rebuilt by Demetrius Poliorcetes on a hill between the rivers Asopus and Helisson, about 10 m. N. W. from Corinth. The hill is triangular, commanding a most beautiful prospect, and was surrounded by walls. The streets, which can still be traced, were regularly laid out at right angles. It contained a market place, theatre, gymnasium, race course, and a great number of temples. From the town the surrounding small district was called Sicyonia. This was bounded N. by the Corinthian gulf, E. by Corinth, S. by Phlius and Cleonæ, and W. by Achaia. Sicyon was one of the Dorian states, and for about a cen-



ture, commencing 676 B. C., was ruled by tyrants. It took part in the Persian wars, was subsequently repeatedly assailed by the Athenians, and in the Peloponnesian war sided with the Spartans. Sicyon attained its greatest historical importance through its general Aratus, who united it to the Achaean league. But more than for military achievements it was distinguished for its painters and sculptors, and was for a long time the chief seat of Grecian art, giving its name to the school founded by Enpompus, and distinguished by Apelles and Pamphilus. It was also the birthplace of Lyssippus the sculptor. Its inhabitants were noted for their taste in dress, setting the fashion in many things all over Greece. Its decline commenced under the Romans, and shortly after the beginning of the Christian era many of its buildings were in ruins.

SIDDONS, SARAH, an English actress, born in Brecon, South Wales, July 5, 1755, died in London, June 8, 1831. She was the eldest of a distinguished family of actors and actresses, the children of Roger Kemble (see KEMBLE), and appeared upon the stage when a mere infant. Thenceforth she continued to perform regularly in her father's company, and at 13 years of age took the principal female parts in several English operas. At 18 she was married to Mr. Siddons, a young actor in the Kemble company; and at a performance of *Belvidera*, in Otway's "*Venice Preserved*," at Cheltenham, soon after, she made so favorable an impression upon a party of fashionable people from London, accidentally present, that an engagement was procured for her at Drury Lane theatre, then under the management of Garrick. She made her first appearance there Dec. 29, 1775, as Portia in the "*Merchant of Venice*," Garrick playing Shylock; but she failed to produce any decided impression. So unpromising were her remaining performances, that at the close of the season she received her dismissal from the company. This proved a cruel disappointment, and for a year and a half her health failed so rapidly that it was feared she was hastening to a decline. For the sake of her infant children she finally shook off her despondency, and, after performing with great effect at various provincial theatres, enjoyed the satisfaction of being solicited to reappear at Drury Lane. On Oct. 10, 1782, being then in the vigor of her physical powers and the maturity of her personal beauty, she commenced her second engagement in London as Isabella in "*The Fatal Marriage*," and produced a profound sensation. For many nights the performance was repeated to crowded houses, and thenceforth she took her place at the head of the British stage, her preëminence being for 30 years undisputed. During this period several unworthy attempts were made to weaken her hold upon the public favor; but her honesty, courage, and candor enabled her to triumph over all the machinations of her enemies until her retirement from professional life, June 29, 1812. On this occa-

sion she played Lady Macbeth; and the moment the night scene was over, the audience rose in a body and demanded that the play should close. For a few seasons she gave public readings from Shakespeare and Milton, and on several special occasions reappeared in her favorite parts. But subsequent to June 9, 1818, when she played Lady Randolph for the benefit of Charles Kemble, she never appeared before the public in a professional capacity.—In person Mrs. Siddons was of middle height, although from the majesty of her appearance she seemed taller than most women, and her figure until near the close of her dramatic career was of exquisite symmetry. She had a clear, pale complexion, coal-black hair, dark bright eyes, and a countenance of extraordinary flexibility, yielding instantaneously to every change of passion. Her genius, which inclined at the outset of her career to pathetic characters, as Isabella, Ophelia, Jane Shore, Belvidera, or Euphrasia, was afterward devoted almost exclusively to those of power and majesty; and she became identified in the public estimation with the lofty attributes of Lady Macbeth, Catharine of Aragon, Constance, and Volumnia, her performance of the first named part being, according to Lord Byron, "something above nature." Imogen, Desdemona, Portia, Hermione, Calista, Zara, Elvira, Mrs. Beverley, and Mrs. Haller were also included in her range; and she occasionally attempted such characters as Rosalind or Mrs. Oakley, but with comparatively moderate success, being too stately and heroic for comedy. Hazlitt, speaking of the effect of her presence and acting, says: "She appeared to belong to a superior order of beings, to be surrounded with a personal awe, like some prophetess of old, or Roman matron, the mother of Coriolanus and the Gracchi. Her voice answered to her form, and her expression to both. Yet she was a pantomime actress. Her common recitation was faulty. It was in bursts of indignation or grief, in sudden exclamations, in apostrophes and inarticulate sounds, that she raised the soul of passion to its height, or sunk it in despair." So complete was her stage abstraction, that the very actors performing with her have been known to shrink with terror from her fierce disdain or withering scorn. It is related also that she was often led off the stage after her impassioned acting in the "*Gamester*," or any of her favorite parts, in strong hysterics. She passed the latter years of her life in affluence, not less esteemed for her exemplary conduct in all the relations of life than for her surpassing genius. Her life has been written by Thomas Campbell (2 vols., London, 1834), and a portrait of her as the tragic muse forms one of the most celebrated of Reynolds's pictures.

SIDEREAL TIME. See DAY.

SIDMOUTH, LORD. See ADDINGTON.

SIDNEY, ALGERNON, an English statesman and republican, born in 1622, executed on Tower hill, London, Dec. 7, 1688. He was the

2d son of the 2d earl of Leicester by the eldest daughter of the earl of Northumberland, and, what was a much higher claim to consideration, a grand-nephew of the illustrious Sir Philip Sidney. At 10 years of age he accompanied his father to Denmark, where the latter was accredited as ambassador, and during a residence of several years at the Danish and French courts he educated himself in the chief accomplishments and learning of the age. In 1641 he served in Ireland as captain of a troop of horse in a regiment commanded by his father; and at the outbreak of the civil war, while on his way with his brother to join the king's forces, he was detained at Liverpool by order of parliament. The king believed that this had been done through the connivance of the young men, who, resenting his distrust, at once declared for the parliament. Algernon Sidney was in May, 1644, commissioned a captain in the earl of Manchester's army, fought with gallantry at the battle of Marston Moor, where he was severely wounded, and in 1646 was appointed lieutenant-general of horse in Ireland, and governor of the city of Dublin. In the same year he entered parliament for Oardiff, and in May, 1647, was made governor of Dover castle. He acted as one of the judges of the king, but refrained from signing the warrant for his execution, although he subsequently characterized it as "the justest and bravest action that ever was done in England or anywhere else." His republican principles were however little in accord with the ambitious views of Cromwell, and his opposition to the assumption by the latter of the protectorship compelled him to relinquish his legislative duties; and in April, 1653, he retired to his father's residence at Penshurst. He resumed his seat at the first meeting of the long parliament in 1659, and was absent from England on an embassy to negotiate a peace between Sweden and Denmark at the time of the restoration. Unwilling to return to his native country while it remained under "the government of a single person, kingship, or house of lords," he submitted to a voluntary exile which extended over a period of nearly 18 years. "I have ever had in my mind," he said, "that when God should cast me into such a condition as that I cannot save my life but by doing an indecent thing, he shows me the time is come wherein I should resign it; and when I cannot live in my own country but by such means as are worse than dying in it, I think he shows me I ought to keep myself out of it." Intent upon establishing an English republic, he made overtures to the Dutch government in 1665 to attempt the invasion of England, with a view of securing that object; and in the succeeding year he endeavored to persuade the French ministers that it was against their interests that England should continue a monarchy. Failing in both instances, he retired to the south of France, where he lived until 1677, when, at the solicitation of his father, who was drawing

near the close of his life and wished to see him once more, he was permitted to return home. He soon became an active opponent of the court, but being watched by the party in power, who both hated and feared him, he was defeated in two attempts to obtain a seat in parliament. It was about this time that Barillon, the French ambassador, was carrying on a clandestine intercourse with the prominent members of the popular party, who, for the sake of crushing the duke of York and the Roman Catholics and overthrowing a corrupt parliament and ministry, did not scruple to receive pecuniary assistance from the French king; and among those who, as Macaulay observes, "were mean and indelicate enough to let a foreign prince pay them for serving their country," was Algernon Sidney, to whom 500 guineas are alleged to have been paid by Barillon. He adds that "it is impossible to see without pain such a name in the list of pensioners of France;" and some of the admirers of Sidney have ventured to call the truth of the statement in question. Hallam however points out the moral distinction between the acceptance of a bribe to desert or betray our principles, and that of a trifling present for acting in conformity to them; and in view of the fact that the latter was by no means repugnant to the practice of the age, and that Sidney was at that time a distressed man, he is disposed to consider it not unnatural that one so circumstanced should have accepted a small gratification from the king of France, which implied no dereliction of his duty as an Englishman, or any sacrifice of political integrity. The discovery of the Rye House plot, in June, 1683, gave the king an opportunity to exact vengeance for years of restraint and humiliation; and Sidney, with his illustrious companion in misfortune, Lord William Russell, was arrested on a charge of complicity with the conspirators, and imprisoned in the tower. That Sidney had been for many years laboring to subvert the monarchy admits of no doubt; but that he could have descended so low as to imagine that "to waylay and murder the king and his brother was the shortest and surest way of vindicating the Protestant religion and the liberties of England," is utterly irreconcilable with his character and previous career. At his trial, over which Jeffreys presided, but a single living legal witness to the conspiracy for an insurrection, the infamous Lord Howard, could be produced; but for the purpose of completing the testimony, garbled extracts from a theoretical work on government in manuscript, which had been found among his papers, and which had perhaps been written many years previous, were permitted to be read in evidence against him. These, though containing assertions of the right of a people to depose an unworthy sovereign, were unconnected by other evidence with the conspiracy itself; under the ruling of the court, they were nevertheless deemed sufficient to convict the prisoner. Sidney met his

death with a heroism which has enrolled him among the noblest martyrs of freedom in any age. "He marched to the scaffold," says Prof. Smyth, "as to a victory, displaying at his execution, as on his trial, all the bold and sublime traits of the republican character;" and his lofty bearing so impressed the spectators, that they "presumed not to shed tears in his presence, although their tears had bedewed the scaffold of Lord Russell."—To what extent the enthusiastic veneration attached to the name of Sidney has been affected by the manner of his death, cannot perhaps be determined to the satisfaction of his admirers; impartial writers are inclined to think him more fortunate in his death than in any action of his life. "He possessed," says Hallam, "no doubt a powerful, undaunted, and active mind, stored with extensive reading on the topics in which he delighted. But having proposed one only object for his political conduct, the establishment of a republic in England, his pride and inflexibility, though they gave dignity to his character, rendered his views narrow, and his temper unaccommodating. For this idol of his speculative hours he was content to sacrifice the liberties of Europe, to plunge the country in civil war, and even to stand indebted to France for protection. He may justly be suspected of having been the chief promoter of the dangerous cabals with Barillon; nor could any tool of Charles's court be more sedulous in representing the aggressions of Louis XIV. in the Netherlands as indifferent to our honor and safety." Sidney's attainder was reversed by the first parliament of William and Mary. His "Discourses concerning Government" were published for the fourth time, together with his "Apology," dated on the day of his death, and a number of letters and miscellaneous pieces, in 1772, under the editorial supervision of Mr. Brand Hollis; and there are said to be several treatises by him in Latin and Italian, and also an "Essay on Virtuous Love," still remaining in manuscript at Penshurst, the ancient seat of the Sidneys. The fragmentary distich,

manus hæc inimica tyrannis  
Enso petit placidam sub libertate quietem,

which he wrote in the university album at Copenhagen, is perhaps the best remembered extract from his writings. His trial, after having been subjected to the revision of Jeffreys, who struck out whatever he pleased, was published in 1684; it is also given in "Howell's State Trials." His life has been written by George Wilson Meadley (8vo., London, 1813); see also Arthur Collins's "Memoirs of the Lives and Actions of the Sidneys," prefixed to his "Letters and Memorials of State," &c. (2 vols. fol., London, 1746), and Blencow's "Sidney Papers" (8vo., London, 1818).

SIDNEY, SIR PHILIP, an English author and gentleman, born in Penshurst, Kent, Nov. 29, 1554, died in Arnheim, Holland, Oct. 16, 1586. His father, a descendant of William Sidney,

chamberlain to Henry II., was in his youth the bosom friend of Edward VI., and during the reign of Elizabeth held for many years the office of lord deputy of Ireland. His mother was the eldest daughter of the ambitious and unfortunate John Dudley, duke of Northumberland, and sister of Robert Dudley, who, as earl of Leicester, figured so prominently among the Elizabethan statesmen. Philip Sidney gave early evidence of the possession of rare virtues and talents, being in childhood, as his friend and panegyrist Lord Brooke has observed, "of such staidness of mind, lovely and familiar gravity, as carried grace and reverence above greater years; his talk ever of knowledge, and his very play tending to enrich his mind." At the age of 12 he was sent to the grammar school of Shrewsbury, and in 1569 was entered at Christchurch college, Oxford, where he cultivated with remarkable assiduity the whole circle of arts and sciences. He subsequently studied at Cambridge, and at both universities was distinguished not less for preëminence in manly exercises than in mental accomplishments. In May, 1572, he obtained a license from the queen "to go out of England into parts beyond the seas," in order to perfect his knowledge of the continental tongues. At the court of Charles IX. of France he attracted the marked attention of the king, who appointed him gentleman in ordinary of his chamber; but the dreadful spectacle of the massacre of St. Bartholomew's day induced him to make an abrupt departure from Paris, and he travelled successively through Germany, Hungary, Italy, and the Low Countries, gaining the affection and permanent esteem of the many learned persons he encountered, and by his personal graces and polished manners extorting the admiration of princes and their courts. Returning to England at the expiration of 3 years, he appeared at court, and straightway took his place among the foremost of the accomplished Englishmen of the time. The queen showed him special favor, and called him "her Philip," in opposition, it is supposed, to Philip of Spain, her sister Mary's husband. In 1576 he was nominated ambassador to Vienna to condole with the emperor Rudolph on the demise of his father, Maximilian II., and at the same time to cement an alliance of the Protestant states against Spain, a mission which he discharged during a year's absence with adroitness and to the satisfaction of the queen and her ministers. For several years after his return to England he was employed in no important public capacity, partly from his reluctance to give up those literary occupations which could only be pursued in private life, and partly, it has been suggested, through the machinations of Lord Burleigh. He however came manfully and successfully forward in defence of the character of his father, whose administration in Ireland had been misrepresented by enemies at court; and in 1580 he addressed to the queen a "Remonstrance" against her proposed marriage

with the duke of Anjou, afterward Henry III. of France, which is characterized by Miss Aikin as "at once the most eloquent and the most courageous piece of that nature which the age can boast," and which is alleged to have had the effect of diverting her majesty from her intentions. When admonished by the queen soon afterward, in consequence of a dispute in the tennis court between himself and the earl of Oxford, which the latter had provoked by his insolence, of the difference in degree between earls and gentlemen, he replied that, "although Oxford was a great lord by birth, alliance, and grace, yet he was no lord over him; and therefore the difference of degrees between freemen could not challenge any other homage than precedence." Although the answer was taken in good part by the queen, Sidney deemed it prudent to retire for a while from court; and while residing at the seat of his sister, the countess of Pembroke, he amused himself by planning and composing his pastoral romance of "Arcadia," the most important and the best known effort of his genius, and which, according to Hallam, is "the only original production of the kind worthy of notice which our older literature can boast." It is written in prose, interspersed with short poems, but, as an old biographer of Sidney remarks, is really "a piece of prose-poetrie; for though it observeth not numbers and rhyme, yet the invention is wholly spun out of the phansie." It never received the finishing touches and corrections of the author, and was moreover left by him incomplete. After circulating in manuscript for several years, it was first published in 1590; and such was its popularity, that previous to the middle of the 17th century upward of 10 editions had appeared. To this period also probably belong the "Defence of Poesie," published in 1595, and originally designed as an answer to the attacks of the Puritans, and the series of amatory poems entitled "Astrophel and Stella" (1591), which recount the author's passion for Lady Rich, sister of Lord Essex, to whom he had been at one time betrothed. The former work is one of the first good specimens of prose writing in the language; the latter exhibits the author indulging in sentiments which, if conformable to the manners of the age, were far from being Platonic, or, to use the severe language of Godwin, "employing all the arts of poetical seduction to contaminate the mind of the woman he adores," an opinion in which Hallam is inclined to concur. Most of Sidney's panegyrists, however, deny that these poems contain any alloy of licentiousness; Dr. Zouch, his most elaborate biographer, makes no allusion to the subject. In the intervals of his literary occupations he participated in courtly pageants and jousts, the most conspicuous of all the brilliant circle who surrounded the throne; and in 1583 he was married to the daughter of Sir Francis Walsingham, and knighted by the queen. Tiring of an inactive life, he secretly planned to accompany Drake

on an expedition to America, but was ordered by the queen to remain in England; and according to the common report she interfered to prevent his election to the vacant throne of Poland, "out of her fear to lose the jewel of her times." As some recompense for these disappointments, Sir Philip was in 1585 nominated governor of Flushing, and in the latter part of the year appointed general of horse under his uncle the earl of Leicester, who was sent with a body of English troops to aid the Dutch in their war of independence. The earl's ignorance of military operations would on several occasions have produced serious disasters, had he not been seconded by the prudent counsels and valor of his nephew. The latter was fast building up a reputation as a skilful general when his career was brought to an untimely close. On Sept. 22 a small detachment of English troops under his command unexpectedly encountered a body of 3,000 Spaniards who were marching to the relief of Zutphen, and a desperate engagement was fought under the walls of the fortress, in which the enemy were signally defeated. Sidney, seeing the Spanish leader going into battle lightly armed, was induced by a chivalric spirit of emulation to imitate his example; and after a series of gallant charges, in which he had a horse killed under him, he received a musket ball in his left thigh. While leaving the field he exhibited an act of disinterested generosity, which perhaps does more than any other incident in his life to illustrate his character. "Being thirsty with excess of bleeding," says Lord Brooke, "he called for drink, which was presently brought him; but as he was putting the bottle to his mouth, he saw a poor soldier carried along, who had eaten his last at the same feast, ghastly casting up his eyes at the bottle. Which Sir Philip perceiving, took it from his head before he drank, and delivered it to the poor man, with these words: 'Thy necessity is yet greater than mine.'" He lingered several weeks in great agony, and met his death with cheerful serenity, solacing his last hours even with literary composition. His body was brought to London, and after lying in state was interred in St. Paul's cathedral, Feb. 16, 1586, in the presence of many distinguished persons, including deputies from the seven United Provinces. A general mourning, the first of the kind on record in England, was also observed. In personal character Sir Philip realized the idea of the *preux chevalier* of the middle ages; and to frankness, amiability, and modesty he united a just appreciation and encouragement of literary men. Spenser has embalmed their mutual friendship in a pastoral ode entitled "Astrophel." He left an only daughter, who became 5th countess of Rutland, but died without issue; and his name is now represented in the English peerage by Lord De l'Isle, a descendant of his brother Robert. His "Complete Works" were published in London (3 vols. 8vo., 1725), and his "Mis-

cellaneous Works" were edited, with a memoir, by W. Gray (Oxford, 1829; reprinted, Boston, 1860).—MARY, countess of Pembroke, sister of the preceding, born in Penshurst about 1556, died in London, Sept. 25, 1621. She is intimately connected with the private history of her illustrious brother, who was bound to her by a congeniality of tastes as well as of temper, and whose chief literary productions were written under her roof and probably for her amusement. He joined with her in a translation of the Psalter "into sundry kinds of verse," first printed in London in 1623, and his "Arcadia" was dedicated to her. She was a woman of considerable culture, and wrote an elegy on her brother, a pastoral poem in praise of Astræa (Elizabeth), and a poem entitled the "Countess of Pembroke's Emanuel," beside translating from the French the "Tragedy of Antonie."

SIDON. See SAIDA.

SIDONIUS, CAIUS SOLLIUS APOLLINARIS MODESTUS, a Latin writer, born probably in Lyons about A. D. 431, died Aug. 21, 482, or according to others 484. He was of a family of high rank, and improving his natural talents by constant study, he rapidly acquired great fame, and when still young married the daughter of Flavius Avitus. When in 456 his father-in-law became emperor, Sidonius accompanied him to Rome, was made senator and prefect of the city, and his statue was placed in one of the porticos of Trajan's library. After the downfall of Avitus, he wrote a panegyric upon the victor Majorian, for which he was honored with the title of count. He afterward passed some years at Lyons, and in 467 was sent to Rome as ambassador to the emperor Anthemius from the Arverni, and there delivered a panegyric, which secured him the rank of patrician, the appointment a second time of prefect of the city, and the honor of another statue. In 472 he reluctantly accepted the bishopric of Clermont in Auvergne, not having previously been connected with the church; but he fulfilled the office faithfully, and labored strenuously against the progress of Arianism. His extant works are poems and letters, the latter numbering 147. The *editio princeps* of his works is that of Milan (fol., 1498); the best is that of Sirmond (4to., Paris, 1652).

SIEBENGEIRGE (the "Seven Mountains"), a mountain group of volcanic origin in Rhenish Prussia, on the right bank of the Rhine, about midway between Cologne and Coblenz, forming a branch of the Westerwald. It consists of the Drachenfels, on which is a ruined castle of the 12th century; the Wolkenberg, having important stone quarries; the Stromberg or Petersberg, on the summit of which is a chapel of St. Peter, much visited by travellers; the Löwenberg, the loftiest in the range, rising 1,560 feet above the sea level; the Nonnenstromberg, the Oelberg, and the Hemmerich. The valleys between them are very rich and fertile.

SIEBOLD, PHILIP FRANZ VON, a German trav-

eller and naturalist, born in Würzburg, Feb. 17, 1796. He was educated at the university of Würzburg, and in 1823 received from the government of the Netherlands the appointment of physician and naturalist on the colonial establishment at Java, whence he was transferred to the embassy at Japan. For several years he made careful explorations in the district adjacent to the Dutch factory at Desima, being assisted by Japanese naturalists, who came from remote districts to enjoy his instructions; and in 1826 he accompanied the embassy to Yeddo. His zeal in the prosecution of scientific inquiries finally brought him into collision with the Japanese government, and in 1828 he was expelled from the kingdom, but succeeded in saving his collections and manuscripts. After a short residence in Java he returned in 1830 to Holland, and has since occupied himself with literary labors connected with his Japanese researches. His chief works are: *Epitome Lingua Japonicæ* (Batavia, 1826; 2d ed., Leyden, 1853); *Atlas von Land- und Seekarten vom Japanischen Reiche*; *Nippon, Archiv zur Beschreibung von Japan*, an elaborate illustrated work, commenced in 1832, and not yet completed; *Fauna Japonica* (Leyden, 1833-'46); *Bibliotheca Japonica* (1833-'41); *Catalogus Librorum Japonicorum* (1845); and *Urkundliche Darstellung der Bestrebungen Nederlands und Russlands zur Eröffnung Japans* (1854). He now resides in Nagasaki, and his valuable collections illustrating the natural history and ethnography of Japan are deposited in the museum at Leyden.—KARL THEODOR ERNST VON, a German physiologist and anatomist, cousin of the preceding, born in Würzburg, Bavaria, Feb. 16, 1804. He studied medicine under his father, Adam Elias von Siebold, a distinguished physician, and in 1840 was called to the chair of zoology, comparative anatomy, and veterinary surgery at Erlangen, whence in 1845 he was transferred to Freiburg, and in 1850 to Breslau. In 1853 he founded at Munich a physiological institute, in which he occupies the chair of physiology, comparative anatomy, and zoology. He is also director of the zoologo-zootomic cabinet. He is the author of an excellent "Treatise on the Comparative Anatomy of the Invertebrate Animals," of which an English translation was published in London in 1854; of a "Manual of Zootomy;" and of numerous papers, some of which, on the structure of the inferior animals, have been republished separately.

SIEGE. See FORTIFICATION.

SIENITE. See SYENITE.

SIENNA (properly *terra di Siena*, earth from Sienna), an ochreous natural compound, employed by artists as a paint of brown color. It is used either raw or burnt before grinding.

SIENNA (It. *Siena*; anc. *Sena Julia*), the capital of the province of the same name in Tuscany, situated on two hills in a dreary plain, 31 m. S. E. from Florence; pop. in 1855, 25,435. The approach to the city is by beautifully shaded avenues, and the immediate vicin-

ity is handsomely planted with trees. The streets are narrow, and in many cases so steep as to be impassable for vehicles. The cathedral, commenced A. D. 1243, is one of the first examples of Gothic architecture in Italy; and the palaces present fine specimens of the mediæval domestic Gothic. It has a university founded in 1203, and once in the highest repute; it now possesses a library of 40,000 volumes and 3,000 manuscripts, but it is much reduced from its former prosperity.—In the middle ages this was one of the most powerful republics of Italy, at one time containing 100,000 inhabitants, and for a long time the rival of Florence, with which it had frequent contests. During the latter part of the 14th century civil war arose, and continued at intervals for a very long period until 1555, when, having been taken by Spain, it was transferred to Cosmo de' Medici.

SIERRA, a N. E. co. of California, bounded E. by Nevada territory, and drained by Yuba river and several smaller streams; pop. in 1860, 11,389. The surface is mountainous, including several peaks of the Sierra Nevada, of which Saddle Peak is 7,200 feet high, Table mountain 8,000 feet, and the Buttes, at the head of the S. fork of Yuba river, 9,000 feet. The land is not fertile, and in 1857 only 575 acres were under cultivation; but it is one of the best mining counties in the state. Tunnels have been opened at a cost of \$500,000. In 1857 there were 11 quartz mills and 30 stamps, costing \$105,000, and 36 saw mills. Capital, Downieville.

SIERRA LEONE, a British colony on the W. coast of Africa, which occupies a small peninsula terminating in Cape Sierra Leone, lat. 8° 30' N., long. 13° 18' E., and extending N. to the estuary of the same name, and E. to the Bunce river; area, about 300 sq. m.; pop. 44,500. Beside Free Town, the capital, there are several villages. The peninsula is mountainous, some of the peaks rising to the height of 3,000 feet above the sea. There are tracts of level ground, however, and several small valleys, the whole being well watered by numerous streams. The climate is exceedingly unhealthy for Europeans. During December, January, and February a dry wind blows from the N. E., and the atmosphere is filled with fine sand. Rain falls in torrents for 6 months. The average annual temperature is 82° F. The land breeze, which begins to blow in the evening, comes over swampy ground laden with malaria. The geological formation is volcanic, and iron ore is found in the more elevated parts. The country is well wooded, the forests extending to the tops of the mountains. The soil is not naturally very productive, but cassada, cacao, maize, ginger, ground nuts, Guinea corn, yams, plantains, sugar cane, and fruits are all successfully grown. The total extent of land under cultivation in 1853 was 9,414 acres. There are many wild animals, including antelopes, monkeys, &c. There are few horses, but horned cattle, sheep, and goats are abundant.

In 1856 the exports amounted to \$901,925, and the imports to \$764,535. In the same year there were 66 schools; there are numerous houses of worship, and several of the natives are employed as Christian missionaries in the surrounding countries. Sierra Leone is ruled by a governor and legislative council, and the laws are the same as those of England.—The settlement was originally formed in 1787 by Granville Sharp and other philanthropists, with the view of providing a suitable home for destitute negroes from different parts of the world, as well as establishing a centre from which civilization might extend to other parts of Africa. In 1789 it was destroyed by a neighboring chief. Sharp, Wilberforce, and others then formed the Sierra Leone company, and the settlement of Free Town was founded. The inhabitants suffered much from fever, and the French plundered it in 1794. The settlement was again reestablished; but the pecuniary affairs of the company being embarrassed, Sierra Leone was transferred to the British government in 1808, since which time it has steadily advanced.

SIERRA MADRE, a chain of mountains in Mexico, commencing a little N. of the city of Mexico, near Queretaro, and extending northward into New Mexico. Near Guanajuato it divides into 3 chains, known by several local names, as Sierra Acha, Sierra Verde, and Sierra de los Mimbres. The central or principal of these chains, also called the Cordillera of Anahuac, extends S. E. and N. W. to the S. line of the state of Durango, when it turns northward, and continues an almost direct N. course into New Mexico. The eastern branch passes through Coahuila into Texas; and the western, trending N. W. toward the river Gila, unites along the bank of that river with some spurs of the California mountains. The name is continued through New Mexico, though some geographers insist that the division between the Rocky mountains and the Sierra Madre is in the depression between lat. 26° and 32° N. Near Guanajuato this range contains some of the richest deposits of silver in the world.

SIERRA MORENA. See SPAIN.

SIERRA NEVADA. See CALIFORNIA, and SPAIN.

SIEVE, an instrument for separating the finer particles of any powder from the coarser. It consists of some kind of network stretched across a drum. The ancient Egyptians made sieves of their rushes, and the hieroglyphic denoting them is borrowed from these plants. They afterward used a network of strings. The Gauls, according to Pliny, were the first to use horse hairs for this purpose. These continue in use, and fine sieves are now made of silk thread, and coarser ones of wire of numerous degrees of fineness, designated by the number of holes to the inch. For sifting materials of an acid nature the wires are brass. By means of sieves a thorough intermixture of different powders that will all

pass through is effected.—Sieves for separating sand from gravel and such purposes are called screens. They are often made in the form of a long cylinder, which is set slightly inclined upon its axis, and the different belts around this are of different degrees of fineness, growing coarser toward the lower end. The materials are charged in the upper end, and are delivered below the screen assorted according to their sizes. The operation of such screens is described in the articles ANTHRACITE, and RICE.

SIEVEKING, AMALIE, a German philanthropist, born in Hamburg, July 25, 1794, died there, April 1, 1859. Though enjoying excellent advantages for obtaining an education, from indolence she acquired so little knowledge, that after she commenced teaching she was under the necessity of first learning every thing which she taught. In her 18th year she came under influences which prompted her to a life of Christian activity. She commenced teaching a single pauper child at this time, and the next year added 6 or 7 others to her class; and she continued teaching the children of the poor for nearly 20 years. During the prevalence of the cholera in Hamburg in 1831 she served as a nurse in one of the public hospitals, and organized an association of women whom she named the "friends of the poor," to visit and comfort the sick. She at the same time maintained her school, though teaching but little in person, founded an asylum for neglected and abandoned girls, erected model dwelling houses for the poor, and undertook the amelioration of the condition of the prisons. In all these labors she had the efficient coöperation of the celebrated Dr. Wichern. Being summoned to the courts of Denmark and Prussia, to organize, under the patronage of the queens of those countries, similar institutions there, she founded in Copenhagen an association of friends of the poor, and at Berlin a house of deaconesses. She was greatly revered in Hamburg, and abundant means were furnished her by its wealthy citizens for the prosecution of her various enterprises.

SIEYÈS, EMMANUEL JOSEPH, count, better known as abbé, a French statesman, born in Fréjus, May 3, 1748, died in Paris, June 20, 1836. After completing his studies in the Paris university, he took orders, received in 1775 a canonship in Brittany, became in 1784 vicar-general and chancellor of the bishop of Chartres, and while attending to his professional duties devoted all his leisure hours to metaphysical and political speculations. The ministry having invited the French writers to present their views upon the summoning of the states-general, he almost simultaneously published 8 pamphlets: *Vues sur les moyens d'exécution dont les représentants de la France pourront disposer en 1789*; *Essai sur les privilèges*, a vindication of the rights of the people; and *Qu'est ce que le tiers état?* The last named pamphlet asserted that the third estate was the nation itself; and in case the two

privileged orders should refuse to join them, the third must organize themselves into a national assembly. It went at once beyond the English constitution, and advocated the establishment of a representative democracy. Sieyès was elected deputy to the states-general by the constituency of Paris, and was at once the leading spirit among his colleagues. He moved that the three orders should immediately meet in general assembly to verify their powers in common; and the privileged orders refusing to comply with this motion, he insisted that the third should declare itself the "national assembly." He drew up the oath taken by the deputies, June 20, 1789, at their meeting in the tennis court at Versailles; and 3 days later, when the king vainly attempted to dissolve the assembly, and Mirabeau sent back M. de Brézé to his master with such threatening words, Sieyès, addressing his colleagues in a cooler but no less effective manner, said: "We are to-day what we were yesterday; let us deliberate!" He was no orator, but he originated several of the most important measures that were adopted by the constituent assembly, including the organization of the national guards and the division of France into departments. A "Declaration of Rights" which he proposed to append to the constitution being set aside by a negative vote, he published it in his *Préliminaires de la constitution Française*. Having in vain dwelt on the necessity and justice of redeeming ecclesiastical tithes, instead of merely abolishing them, he vindicated his opinion in his *Observations sur les biens ecclésiastiques*, prefacing it with these words: "They want to be free, and do not know even how to be just," which he had uttered in the assembly. This somewhat impaired his popularity; but he was elected to the presidency of the assembly, June 17, 1790, and a few days later was greeted with huzzas on appearing in the Palais Royal garden. Some months previous he had published his *Aperçu d'une nouvelle organisation de la justice et de la police en France*, in which he insisted upon jury trial in civil as well as criminal cases. In 1791, on the civil constitution of the clergy being adopted, he declined the archbishopric of Paris, which was tendered him. After the flight of the king to Varennes, he vigorously opposed those who aimed at overthrowing the monarchy and establishing a republic. During the legislative assembly he retired to private life, but reappeared in the convention in 1792, being elected by 3 departments at once. A member of the committee on the constitution, he retired from it when he saw that he could not make his views prevail. On the trial of the king, he at first protested against the unlawful assumption of powers by the convention; but yielding to the decision of the majority, he sat as one of the judges, and silently voted for death without appeal to the people. He kept as quiet as possible during the reign of terror, giving up his priesthood and the pen-



sion he was entitled to, and after the fall of Robespierre regained some influence among the moderate party. He moved the restoration of the surviving Girondists to their seats in the assembly, and had a large share in the direction of foreign policy. On the establishment of the directorial government he was elected one of the 5 directors, but declined that post, contenting himself with being a member of the council of 500. In 1798 he was sent as minister plenipotentiary to Berlin, and skilfully secured the neutrality of Prussia. On his return to France he became a director. On the return of Bonaparte from Egypt, he secretly agreed with him; but after the *coup d'état* of the 18th Brumaire, the liberal constitution which he had prepared was altered so as to suit the despotic aspirations of the first consul; and while Bonaparte seized upon absolute power, Sieyès had to content himself with a seat in the senate, the presidency of which he held for a while. He moreover received as a compensation the princely estate of Crosne, with a large income. Although he figured among those opponents whom Bonaparte styled ideologists, he was afterward made a count of the empire. In 1814, being absent from the senate, he, through Talleyrand's advice, adhered by letter to such measures as were taken by that body against the emperor, but was nevertheless made a peer during the Hundred Days. He however stood aloof, censured the "Additional Act to the Constitution of the Empire," and appeared neither at the meeting in the Champ de Mai nor at the opening of the chambers. On the second return of the Bourbons, he, as a regicide, was obliged to leave France, and sought a refuge at Brussels. After the revolution of July, 1830, he returned to his native country, but only resumed his seat in the academy of moral and political sciences, of which he was an original member.

SIGHT. See EYE, OPTICS, and VISION.

SIGISMUND I., II., and III., kings of Poland. See POLAND, vol. xiii. pp. 429-431.

SIGNALS, NAVAL, a system of telegraphic signs by which ships communicate with each other at a distance, and convey information or make known their wants. This is done by means of a certain number of flags and pennants of different patterns and colors, which indicate the different numerals from 1 to 0. Particular flags or pennants are also used for specific purposes; for instance, one pennant is called the interrogative, and when hoisted signifies that a question is asked; while another flag signifies affirmation, another negation, and so on. To correspond with the flags, signal books are formed with sentences or words which these flags represent. Thus, in some systems, in order to communicate this sentence: "Boats are in want of ammunition," the flags which express 32 are hoisted, that number being opposite to that sentence in the signal books. These books contain a list of the most common words in the language, with a table

of such geographical names as are likely to be needed at sea, and also a list of the ships belonging to the navy of the country. The British admiralty system of signals is very comprehensive, and requires about 50 different flags. In one branch of this system flags signify numbers, and in another the letters of the alphabet. In fogs signals are conveyed by firing guns at stated intervals. Each commander of a man-of-war is also furnished with private and secret signals by which to ascertain whether a ship of war that is in sight is a foreigner or not. Capt. Marryat, the novelist, invented a code of signals for the merchant service which was in use till 1857, when the English board of trade issued "The Commercial Code of Signals for all Nations," which is now in general use by the ships of all civilized countries.—The code of signals used by the U. S. navy was prepared by a board of officers consisting of Commodores McCauley and Lavallette and Commanders Marchand and Steedman, and was adopted by the navy department in 1857. In this system two signal books are used, one called simply the "Signal Book," the other the "Telegraphic Dictionary." A peculiar flag designates when the telegraphic dictionary is to be employed; when this flag is not shown, the meaning of the communication is to be sought in the signal book, which contains all the sentences arranged alphabetically which would occur in ordinary service, numbered consecutively from 1 to about 1,300. The telegraphic dictionary has an alphabet, and also the words of the language numbered from 1 to the end of the book, so that an unusual name may be spelled by the alphabet, or any ordinary word designated by its proper number in the dictionary.—Another board of officers in 1859 examined and tested a system of night signals invented by Benjamin F. Coston, an officer of the U. S. navy, and reported strongly in their favor. They have consequently been adopted by the U. S. government not only for the navy, but, in Oct. 1861, for the use of the army; and during the extra session of 1861 congress made an appropriation for the purchase of the patent from the widow of the inventor. The Coston signals are made by combining certain different-colored pyrotechnic fires in a case to represent certain numbers or figures according to a prearranged chart. A set of these signals consists of 12 pieces marked by the 10 numerals and the letters P, A, respectively. The signal marked P shows a white flame succeeded by a red and that by a white flame, and signifies: "Prepare to communicate." The answering signal A shows a red flame followed by a white and that by a red, signifying that the preparatory signal has been seen and that the vessel telegraphed is ready to communicate. The signals corresponding to the numerals can then be used, each numeral being represented by colors and combinations of colors in the following order: 1, white; 2, white, red; 3, white, green; 4, red;

5, red, white; 6, red, green; 7, green; 8, green, white; 9, green, red; 0, white, red, green. With these signals in clear weather communication can be maintained at night with ease and accuracy between vessels at the distance of 6 and even of 8 or 10 miles.

SIGONIO, CARLO, an Italian classical scholar, born in Modena in 1520, died in 1584. He studied medicine and philosophy at the university of Bologna, and was appointed professor of Greek literature at Modena in 1546, of belles-lettres at Venice in 1552, and of eloquence at Padua in 1560. From Padua he went in 1563 to Bologna, where he received a chair in the university with a good salary and was made a citizen. Among his numerous works are: *De Republica Hebræorum* (4to., 1582); *De Republica Atheniensium* (Bologna, 1564); *De Occidentali Imperio*, from A. D. 281 to 575 (1577); and a continuation of Panvinio's *Historia Ecclesiastica* down to the year 311, first printed with his collected works (6 vols. fol., Milan, 1732-'7). Roman antiquity was a special study with him, and he published many treatises on subjects connected with it; and he is regarded as the creator of the science of diplomatics. From some fragments of a lost treatise of Cicero *De Consolatione*, he wrote a work which he published under that title as a discovery; and the style of the ancient Roman was so well imitated that the counterfeit was not detected immediately, nor finally proved until Sigonio's death.

SIGOURNEY, LYDIA HUNTLEY, an American authoress, born at Norwich, Conn., Sept. 1, 1791. In her 19th year she engaged in teaching a school for young ladies at Norwich, in 1814 removed to Hartford, where she opened a select school, and in 1815 published a volume entitled "Moral Pieces in Prose and Verse." She had written in rhyme from an early age, and had previously published articles in periodicals. In 1819 she became the wife of Mr. Charles Sigourney, a merchant of Hartford, and has since contributed largely to the serious literature of the country. Her poems, which are very numerous, are generally lyrical, though in a few instances she has essayed the epic; they are for the most on religious or serious topics. Her prose works are also very numerous, and are biographical, historical, preceptive, hortatory, and epistolary. Her published works in all number nearly 50 volumes. In 1840 she visited Europe, and in 1842 gave some reminiscences of her visit in a volume entitled "Pleasant Memories of Pleasant Lands." Mrs. Sigourney has ever been an earnest sympathizer with all the objects of philanthropy, and has aided them to the extent of her ability, both with pen and purse.

SIHON. See JAXARTES.

SIKHS, a warlike nation of N. W. India, and until recently the rulers of the region known as the Punjab. They were originally a religious sect of the Hindoos, the word *sikh* signifying disciple. The founder of the sect was Yanaka, commonly called Nanak, a Hindoo of

the warrior caste, born in 1469 near Lahore, who, after a close study of the Koran and the Vedas, as well as the philosophical works of both Hindoos and Moslems, conceived the idea of effecting a fusion of Brahminism and Mohammedanism, on the basis of a pure monotheism and of human brotherhood. Yanaka died in 1539, and was succeeded by his son Angad, who wrote upon his father's doctrines. Considerable changes were made in the system by his successors Amardas and Ramdas; and Arjoon, the son of Ramdas, compiled the Sikh doctrines in a volume called *Adi-Granth*, established himself at Amritsir in 1581, and organized his followers, who had hitherto been only a religious community, into a politico-religious confederation, of which he became the sole chief. As the Sikhs rejected alike the Koran and the Vedas, they drew down upon themselves the hatred both of Moslems and Brahmins; and falling into the hands of his foes, Arjoon died in prison in 1606, after being subjected to horrible tortures. His son, Har Govind, to avenge his death, led the Sikhs against their Mohammedan foes; and from this time for 200 years the Sikhs were engaged in a constant and murderous guerilla warfare with the Mohammedans and Brahmins. About the end of the century Govind, the last of their *gurus* or theocratic chiefs, whose father had been put to death by Aurungzebe, gave them a code of laws, and organized them as a state. He also wrote another sacred book, the lives of his 10 predecessors. In 1716 the Mogul emperor, in a series of battles, provoked by their fanatical attempts to exterminate the Mohammedans, defeated and almost annihilated them. Their religious fervor had long since died out, and for many years they did not recover from this blow; but they finally united their roving bands and drove out the Afghans from the Punjab in 1764. For the following 30 years they were divided into 12 small confederations, called *misals*, which were governed by *sirdars* or petty chiefs, of whom Maha Singh was the most powerful. At his death in 1794, his son Runjeet Singh commenced a series of measures which brought the other sirdars into subjection, and reduced the Punjab to his sway. At his death in 1839 the kingdom of Lahore, as he had named his dominions, fell into anarchy, and under the mismanagement of one of his wives, during the minority of his grandson Dhuleep Singh, war broke out with the English in 1845, which terminated in a treaty of peace, March 9, 1846, by which the greater part of their territory and almost their entire government was ceded to the East India company. This treaty soon led to new complications, and another war, which ended in March, 1849, in the submission of the Sikhs and the complete incorporation of the Punjab in the empire of British India. During the Indian mutiny of 1857 the Sikhs remained faithful to the British government, and rendered efficient aid in quelling the insubordination of the Bengal and other sepoy.

**SIKKIM**, a native state of N. E. Hindostan, bounded N. by Thibet, E. by Bhotan, S. by Bengal, and W. by Nepaul, extending from lat.  $26^{\circ} 40'$  to  $28^{\circ}$  N., and from long.  $88^{\circ}$  to  $89^{\circ}$  E.; area, 1,670 sq. m.; pop. 61,766. The surface consists of a series of ranges of the Himalaya mountains, which on the S. rise abruptly from the plains to the height of from 6,000 to 10,000 feet, and increase toward the N. and N. W., where Kintchinjunga, the loftiest point (with the exception of the neighboring Mt. Everest) yet measured on the surface of the globe, attains the height of 28,178 feet above the sea. The mountains are separated by precipitous ravines, which are nowhere wide enough to form valleys or plains. The drainage belongs to the basin of the Ganges, toward which it flows by the Teesta, which rises in Thibet, and pursues a winding course through Sikkim. The mountains are covered with vegetation to the height of 12,000 feet, and in the lower parts of the country it is often very luxuriant. The soil consists mostly of a rich black mould; and the principal crops raised are millet, maize, and rice, the last of which has been cultivated to the height of 8,000 feet above the sea. The aboriginal inhabitants have Mongolian features, and speak a Thibetan dialect.—The Gorkhas conquered Sikkim in 1789, and it became tributary to them; but during the Nepaul war of 1814 the rajah coöperated with the British, and when peace was concluded his independence was guaranteed, and his dominions increased by the grant of certain tracts which had been ceded to the British by the Nepaulese. In 1836 the rajah resigned the sovereignty of Darjeeling, as compensation for which he received an annual grant of 6,000 rupees (\$3,000) from the East India company. He afterward countenanced some outrages on British subjects, by which he forfeited this allowance, and in 1853 abdicated in favor of his son.

**SILENUS**, in Greek and Roman mythology, a satyr prominent in the retinue of Dionysus or Bacchus. He is differently called the son of Hermes and of Pan, and is represented as a jovial old man with a bald head and fat sensual face, always intoxicated, and mounted upon an ass. In the contest with the giants Dionysus was assisted by Silenus, who slew Enceladus. Silenus is also represented as an inspired prophet, and a sage who despised the gifts of fortune, and is thus the type of that wisdom which conceals itself beneath an uncouth exterior. When drunk and asleep, any one could compel him to prophesy by surrounding him with a garland or chain of flowers. There was a temple sacred to him at Elis.

**SILESIA** (Ger. *Schlesien*), **AUSTRIAN**, a duchy comprising that part of Silesia which remained to the house of Austria after the peace of 1763, bounded by Prussian Silesia, Galicia, Hungary, and Moravia; area, 1,987 sq. m.; pop. in 1857, 443,912, including about 60,000 Protestants. Capital, Troppau. The Carpathian mountains pass through it in the S. E., and the Moravian

in the N. W., and it is watered by the Oder, Vistula, and other rivers. About one third of the territory is covered with forests. For grazing purposes it is one of the most important provinces of Austria, and gives pasture to about 170,000 sheep. Before 1849 it formed with Moravia a single administrative province, but was then established as a separate crown land under the name of the duchy of Upper and Lower Silesia.

**SILESIA**, **PRUSSIAN**, a province of Prussia, bounded N. by Brandenburg and Posen, E. by Russian Poland and Austrian Galicia, S. by Austrian Silesia and Moravia, S. W. by Bohemia, and W. by Saxony; area, 16,200 sq. m.; pop. in 1858, 3,269,613, half of whom were Protestants, 39,000 Jews, 5,000 German Catholics, and the rest Roman Catholics. It is divided into the administrative districts of Oppeln, Breslau, and Liegnitz. Capital, Breslau. It is separated from the Austrian dominions by the Sudetic chain of mountains, which consist of long well wooded ridges with isolated peaks at intervals. There are two principal groups, the Riesengebirge in the N. W. of the range and the Glatz mountains in an opposite direction; the most elevated peak of the former is 5,060 feet high, and of the latter 4,354. Between the mountains there are many fertile valleys of considerable extent. The Oder flows through the province in a N. W. direction, and divides it into two nearly equal portions, that on the left of the river being mountainous, and that on the right flat without any considerable hills. This level portion is sandy, with extensive tracts of heath and stagnant pools. The principal tributaries of the Oder in Silesia are the Bober, Katzbach, Weistritz, Lohé, Ohlau, and Neisse on the left, and the Bartsch, Weide, Malapane, and Klodnitz on the right. A small portion of the S. E. corner is drained by the upper course of the Vistula. The mineral wealth of Silesia is confined principally to the upper or S. E. part of the province. Gold and silver are procured in small quantities; copper, lead, and zinc are found; and coal and iron are both abundant. Quarries of limestone, marble, and sandstone are worked. Pastoral pursuits occupy much attention, and large numbers of cattle and sheep are raised, the wool of Silesia being of superior quality, and forming next to linen the chief export. The inhabitants, mostly Germans, or half Germanized Poles, are remarkably industrious; many of the men are employed in weaving and of the women in spinning. The principal manufactures are linen, cotton, and woollen fabrics, iron, paper, leather, glass, and porcelain and earthenware. Among the principal towns, beside Breslau, are Glogau, Brieg, Oppeln, Liegnitz, and the fortresses of Schweidnitz, Neisse, Glatz, and Cosel. There are several railways in the province, the most important of which are the Lower Silesian, between Berlin and Breslau, and the Upper Silesian, from the latter place to the Austrian frontier, with a branch connecting with the Cracow and Warsaw line.—Silesia

became subject to Poland in the 10th century, and in 1063 it was ruled by 3 independent Polish princes. It was afterward subdivided into numerous petty states, which in detail became tributary to the king of Bohemia, and fell to Austria by inheritance in 1526. It was conquered by Frederic the Great during the 7 years' war, and the greatest part of it was ceded to Prussia by the three successive treaties of 1742, 1745, and 1763.

SILHET, or SYLHET, an E. district of British India, presidency of Bengal, bounded N. by the Cossyah hills, E. by Munnipoor, and S. and W. by Tipperah and Mymensingh; area, 3,532 sq. m.; pop. about 1,000,000. The district is enclosed on the N., E., and a great deal of the S. side by mountains that attain heights varying between 4,000 and 6,000 feet, and near their bases the surface is rugged. The central and W. parts are level, with a few alluvial ridges, and the lower parts subject to periodical inundations which generally keep the surface under water between April and November. The most valuable minerals are coal and limestone. The principal rivers are the Soormah and Menga, the former of which is navigable during the greater part of the year for a considerable distance, and between June and September during the height of the inundation boats leave the channel and hold their course across the country. The climate is extremely unhealthy during the floods. The hilly parts are covered with jungle, but the valleys and banks of the rivers are particularly fertile and well cultivated. Elephants, tigers, buffaloes, deer, and several other kinds of wild animals are numerous. Silhet, the capital, is the head-quarters of the eastern division of the Bengal army.

SILHOUETTE, in the fine arts, the representation of the outlines of an object filled with black color; or, popularly speaking, a black profile. The name is derived from that of M. Etienne de Silhouette, comptroller-general of finances in France in 1757, who, finding the treasury in an exhausted condition, and the country in danger of bankruptcy, recommended a rigid retrenchment and economy in private as well as public affairs. The wits of the time, affecting to take his advice seriously, instituted a number of mock reforms, and replaced the customary portraits by profiles *à la Silhouette*, traced by a black pencil on the shadow cast by a candle on white paper. The invention however is ascribed to the mythical age of Greek art, and is said to have been first practised by the daughter of a Greek potter who drew the outline of her departing lover's portrait on the wall. Monochromes or silhouettes naturally became the earliest representations of a variety of objects, and were produced with great skill and beauty and in boundless variety, as may be seen on the Etruscan vases. In modern practice the silhouette can be taken of any size by the instrument called a pantograph, and is frequently cut directly from black paper with a pair of scissors,

many artists exhibiting great facility in this process as well as in the attainment of correct likenesses. Sometimes the inner parts of a picture are indicated by lines drawn with a lead pencil on the dead black surface of the silhouette.

SILICA, SILEX, or SILICIO ACID (Lat. *silex*, flint), the most abundant of mineral substances, appearing in a pure state in transparent crystals called quartz, and but slightly mixed with other matters in the numerous varieties of that mineral. (See AGATE, CARNELIAN, FLINT, GLASS, QUARTZ, and SAND.) The compound nature of silica was proved by Sir H. Davy, who decomposed it at a white heat by means of the vapor of potassium. It is composed of the base silicon and oxygen, probably one atom of the former to two of the latter; the proportional weights of each are represented by the numbers 14.24 and 16, and the equivalent number of the compound is hence 30.24. As it occurs in nature it is insoluble in water, but is attacked by a current of steam, and is taken up by this and deposited in new places and in new forms. (See GEYSERS.) Its only solvent among the acids is the hydrofluoric, by means of which it is decomposed, and a gaseous compound is obtained of its base with the acid. When passed into water this combination is broken up, and silica is reproduced in the form of little bubbles and white flocculi, which by washing and igniting become perfectly pure and snow-white silica. Pulverized silica, when mixed with an alkaline carbonate and fused, dispels the weaker carbonic acid, and itself combines with the alkali, thus exhibiting its properties as an acid. These, however, are too feeble to act upon test paper. An excess of silica in the alkaline mixture determines the production of glass, which is insoluble in water or in common acids; but if no more silica be added to the melted mass after this ceases to effervesce on its introduction, the product after being cooled may be dissolved in water. The gradual addition of hydrochloric acid, succeeded by evaporation to dryness, renders the silica insoluble when water is introduced to remove the alkaline salt. It is thus obtained in a pure state after being well washed with acidulated water and dried. It is then a light white powder, rough and dry to the touch, without taste or smell, fusible by the oxyhydrogen blowpipe, and when melted may be drawn out into fine, elastic threads. When silica is separated from its alkaline combination by hydrochloric acid, it appears before evaporation as a jelly, which is a hydrate of silica, soluble in a large excess of water; but once deprived of water by heat, it can no more be dissolved. Silica of this character is met with in several mineral compounds. It constitutes the opal, in which the proportion of water varies from 8 to 10 per cent., and also great deposits of a white silicious earth made up of infusorial remains. The zeolites are hydrated silicious compounds, which when finely pul-

verized and treated with hydrochloric acid swell up into the transparent jelly. Silix may be dissolved by long digestion with solution of the alkalies, particularly with the aid of steam at a high pressure. (See SILICATES, SOLUBLE.)—Silica is a product of the vegetable as well as of the mineral kingdom. It is an important element in the composition of the grasses, and forms in chief part the hard external coat of the reeds. By one of the methods of tearing these to pieces by exploding them (see PAPER, vol. xii. p. 785), the silica is separated from the canes in a white powder, and is collected in heaps around the apparatus.—Silica combines with bases and forms silicates, among which are found a large proportion of the minerals. Their variety is multiplied by the number of bases, as lime, alumina, magnesia, protoxide of iron, and several of the other metals, and by the diversity in the relative proportions of the different silicates, the substitution of one base for another, &c. They comprise the hydrous and anhydrous silicates, the former including, beside those already named, the talcs, serpentines, chlorites, &c., and the latter the augites, garnets, micas, feldspars, &c. They are for the most part fusible, and those melt easily which consist largely of fusible oxides. The silicates of the alkalies with large amount of base are soluble in water; they are decomposed by vegetable acids, and gradually even by carbonic acid gas of the atmosphere; but at high temperatures in a furnace the silica, not being volatile, takes the place of most other acids, expelling even sulphuric acid from its combination.

**SILICATES, SOLUBLE.** Mention is made of the soluble alkaline silicates, and of their discovery and early applications to useful purposes, in the article GLASS, vol. viii. p. 294. These substances, now known by the name of water glass, continue to attract much interest, and in consequence of their increasing importance are entitled to further notice. A report has recently been presented to the French government upon their uses for hardening stone, painting, &c., by the processes devised by M. Kuhlmann of Lille; and the subject has been reviewed by Mr. J. W. Ordway in the "American Journal of Science," Nos. 95 and 96 (second series, Sept. and Nov. 1861). The applications in use and proposed will first be noticed, and then the methods of preparing the silicate. Alone it forms a good colorless cement for glass, porcelain, &c. Ordinary quicklime is rendered hydraulic by adding to it the alkaline silicate finely pulverized in the proportion of 11 of silicate to 100 of lime. If the silicate is added in solution to the lime, the mortar sets too quickly to be conveniently used; but mortar of fat lime may sometimes be advantageously wetted with the solution, which then induces the change superficially. This application may prove very important wherever hydraulic lime is not readily obtainable. Applied to soft calcareous stones, as chalk in particular, the solu-

tion has the effect of hardening the stone, and if the application be several times repeated the hardening effect gradually penetrates far into the interior. The surface of calcareous stones may be suddenly hardened and made to appear like compact silicious limestone by merely plunging them into a highly heated solution under pressure. Soft tender bricks are readily hardened so that they will resist the action of sea water. Many applications of the solution made at distant intervals, it is thought, prove more efficacious in rendering the surface of stones durable than the use of chloride of calcium upon the silicate as recommended by Ransome. Plastered walls are greatly improved by a wash of the solution. The method of application upon large surfaces is by sprinkling by means of force pumps with divided jets. For smaller surfaces and sculptures the application is made with brushes, and being repeated on 8 consecutive days the stone is sufficiently hardened. The quantity of solution which is absorbed varies with the nature of the stone and its porosity. Any desired tint is imparted by the introduction of coloring matters into the solution; as for a reddish brown color, sulphate of iron; for green, sulphate of copper; for brown, sulphate of manganese, &c. To whiten the surface artificial sulphate of barytes is added to the solution, and the effect is represented as far superior to that of the purest white lead, while the dangers attending the use and manufacture of the latter are avoided. The water-glass paint moreover is unaffected by sulphurous emanations such as discolor white lead. The artificial sulphate of barytes is prepared from the native sulphate by first transforming this into chloride of barium, and then reconverting it by sulphuric acid into sulphate of barytes, which is thus obtained perfectly pure and in a finely divided state. This preparation, applied to glass by means of silicate of potash, imparts to it a milk-white color of great beauty, and soon becomes so firmly united to the glass that it cannot be removed by washing with warm water. It is transformed into a fine white enamel by partial fusion, or may be tinted by the introduction of pulverized colored enamels. Water glass has also been applied by M. Kuhlmann to the printing of wall papers with colors, and for varnishing papers upon the wall. He also recommends its mixture with lampblack ivory black, or vermilion, for an unalterable writing ink. It is found however that the silicate thus applied is liable to be decomposed and the coloring matter to be released. A very important application, if it can be made successful, is for fixing ultramarine on cloth, for which albumen and caseine are now employed in print works. A vast amount of these articles of food would thus be diverted from manufacturing purposes to the sustenance of man, it being estimated that full 880,000 hens are needed to produce from their eggs the 125,000 kilogrammes of albumen consumed yearly in Alsace alone. In

calico printing, silicate of soda is now a very important agent in removing the mordant that is not fixed in the dyeing, taking the place of the phosphate or arseniate of soda employed for this purpose. (See CALICO, vol. iv. p. 245.) This is probably the most useful of all its applications.—A very strong cement, well adapted for fastening together hard bodies, for restoring defaced public monuments, and for the manufacture of cornice work, is produced by mixing water glass with chalk to form a paste. The silicification is due to the decomposition of the silicate by the carbonate of lime and the carbonic acid of the air. Artificial stone of various sorts has been produced by mixture of fragments, as of limestone, granite, &c., with some absorbent substance, as burnt bones or roasted clay, with the alkaline solution. Artificial meerschaum has been made by mixing lime, magnesia, and carbonate of magnesia with the water glass, and drying.—Other proposed uses of water glass are as a soap and as a manure. For the former purpose its properties differ but little from those of the neutral carbonate of soda, though for some scouring purposes, as for cleaning paint especially, it is said to be better than any thing else. As a fertilizer the silicate may be applied in a weak solution by frequent waterings, or in a finely ground dry powder in compost heaps.—The method first recommended for producing water glass was to boil for many hours under strong pressure quartzose matters with caustic alkaline lye. The process might be materially hastened by using, instead of inert quartz, some native form of hydrated silica, as the infusorial silicious earth occasionally found beneath peat bogs. A much better method is to fuse a mixture of sand and the alkaline carbonate; and in large operations, in which the cost of materials is an object, an alkaline sulphate may be economically substituted, its decomposition being effected by the sand and carbon. In a small way, or for obtaining a very pure article, the materials may be melted in large blue pots; but on a large scale the ingredients, rudely mixed together, may be thrown upon the hearth of a reverberatory furnace and melted down with flaming coal. The hotter the fire the easier it is to get a light-colored article. The brown color may, however, be completely removed by adding, just before drawing the charge, a few pounds of arseniate of soda, or a mixture of arsenic, soda ash, and nitrate of soda, and stirring it well in. Mr. Ordway, who recommends this method, made use of a furnace having a hearth 24 square feet in area, and a grate of 3 feet by 2 feet. With this he worked 4 charges in 24 hours, each consisting of 250 lbs. of soda ash (80 per cent.) and 315 lbs. of pure quartzose sand, consuming about 83 lbs. of Pictou coal per hour. The mass, when well fused, was decolorized with about 4 lbs. of arseniate of soda, and then drawn out into a kettle of cold water, thus avoiding the necessity of subsequent grinding. The glass

thus obtained had a slight greenish color and was quite pure. For a more readily soluble sesquisilicate for calico printing, the charges consisted of 260 lbs. of soda ash and 250 lbs. of sand. If the glass is made more alkaline than sesquisilicate of soda or bisilicate of potash, its solubility causes a considerable loss in drawing it into water, and such should therefore be run into a thick cast iron vessel; and when cold it may be broken up and ground between chilled cast iron rollers, or in a large edgestone mill. All water glass intended for sale must be prepared dry, as when once wet it cannot be dried so as not to form a solid mass when packed in casks. The method of manufacture with an alkaline sulphate is described by Mr. Ordway in the papers referred to. The dry water glass is dissolved for use by boiling in an iron kettle with water, till the solution stands at about 25° Baumé. Thus reduced, the insoluble matter soon subsides, and being removed the liquid may be concentrated by evaporation; but the extent of this is limited, as on becoming thick the silicate adheres tenaciously to the kettle. As the silicate has no definite composition, the proportion of its ingredients is not fixed; but for any use to which the article is applied at present, it should not consist of more than 2 equivalents of soda (143 parts before calcining), or the same of potash (138 parts), to 3 equivalents (91 parts) of silica. Its excellence depends in great part upon its freedom from impurities, especially portions of alkali in the state of carbonate, sulphate, sulphuret, or chloride. Its purity is indicated by a clear, bright, and homogeneous aspect, somewhat transparent.

SILICON, or SILICIUM, the base of silex. It is obtained in a dull brown powder by passing the vapor of chloride of silicon over heated potassium contained in a glass tube. It may also be obtained from the aqueous solution of the gaseous fluoride of silicon. Neutralized with solution of potash, this affords a silicofluoride of potassium, which when well dried is mixed in a glass or iron tube with  $\frac{1}{10}$  or  $\frac{1}{15}$  of its weight of potassium and heated. The silicon set free partially combines with the excess of potassium, from which it is finally removed by washing in water. Silicon is insoluble in water, and in nitric or sulphuric acid, but dissolves in hydrofluoric acid or warm solution of potash. The powder sinks in water, soils the fingers, and is a non-conductor of electricity. When heated in air or oxygen, it burns vividly, and with such intense heat as to fuse the external crust of silica. In its chemical properties silicon exhibits striking analogies with carbon and boron. When strongly heated in a close platinum crucible, it becomes darker in color and of greater specific gravity; it loses its affinity for oxygen, so that it will not ignite even if heated by the blowpipe and immersed in oxygen, and is not attacked by pure hydrofluoric acid.

SILISTRIA (Turk. *Dristra*), a strongly fortified town of European Turkey, in Bulgaria,

capital of an eyalet of the same name, situated on the right bank of the Danube, 57 m. N. N. E. from Shumla and 282 m. N. N. W. from Constantinople; pop. about 20,000. The river is here more than 1,200 feet wide, and studded with numerous islands between the town and the Wallachian shore. The streets are narrow and crooked, the houses low and generally built of wood. As Silistria is a frontier town, built principally as a military station, its manufactures are of little importance. It is a very ancient place, and near the city there are remains of fortifications erected during the Byzantine empire. It was besieged by the Russians in 1773, and again in 1779, when they suffered a severe loss. It capitulated to them in 1810. In 1828 they besieged it for several months, and were obliged to retire; but the following year it was reduced by Gen. Krasowski. In May, 1854, it was invested by a force of 60,000 Russians, who placed 60 guns in battery, but after bombarding it for 39 days they retreated with a loss of about 12,000 men. The Russians were commanded by Prince Gortchakoff, and afterward by Prince Paskevitch; and the Turks by Mussa Kussul Pasha, aided by Captains Butler and Nasmyth of the English army, who were in the place when it was invested. The pasha was killed, and Capt. Butler died from fatigue and his wounds. During the siege the greater part of the town was laid in ruins by the fire of the Russian batteries and by 6 mines which they sprung. The Russians had 16 batteries on an island immediately opposite the town, and heavy guns upon several other islands in the river; and when they retired the greater part of their armament was left behind.

**SILIUS ITALICUS**, **CARRUS**, a Roman orator, statesman, and poet, born about A. D. 25, died in 100. He studied oratory, and by a close imitation of Cicero obtained considerable celebrity, and in 68 was consul. Under Vespasian he was proconsul in Asia, and administered the government of that province very justly. The latter part of his life was spent in retirement, partly in a mansion near Puteoli that had formerly belonged to Cicero, and partly in one near Naples that had been occupied by Virgil, upon whose tomb he is said to have made an annual sacrifice. He died by voluntary starvation to avoid the misery of an incurable disease. His only work extant is an epic poem on the second Punic war entitled *Punica*, which is little more than a metrical version of Livy. Virgil was his professed model in poetry, and is imitated throughout the *Punica* with considerable labor, but not happily. It was first printed at Rome in 1471; the best edition is that of Drakenborch (4to., Utrecht, 1717), and there are several others. It was translated into English verse by Thomas Ross (fol., London, 1661 and 1672); and the original with a French translation was published at Paris in 1837.

**SILJESTRÖM**, **PERH ADAM**, a Swedish scholar and educational writer, born at Kal-

mar in 1815. He became professor of experimental physics and curator at the university of Upsal, and in 1848 was sent by the Swedish government to England, and in the succeeding year to the United States, to examine the systems of public education in those countries. His report on the educational system of the United States was published at Stockholm in 1852-'4, under the title of *Resa i Förenta Staterna* (2 vols. 8vo.), and was translated and published in England in 1858 by Frederica Rowan. The educational system of the leading states of the Union is well and accurately described, and its faults and deficiencies pointed out with great ability and clearness. He had previously published in Stockholm "Observations on Norway," the result of a visit to that country.

**SILK**, a fibre of remarkable delicacy, lustre, and strength, used for producing a textile fabric, and obtained chiefly from the cocoons of the caterpillar of the mulberry tree moth (*bombyx mori*). Some varieties are also made from the cocoons of other insects. (See **SILKWORM**.) The thread produced by the *saturnia mytila* is too fine for reeling, and is consequently carded and spun like cotton; and that of the *saturnia Cynthia* is also spun into yarns like cotton, and is woven into a coarse white cloth of seemingly loose texture, which is so durable as to be scarcely worn out in the lifetime of a single person. The common spider also produces a thread of similar character, but inferior in quality to that of the true silkworm. (See **COBWEB**.) The quantity produced by each spider is moreover so small, and the difficulties attending the rearing of the insects are so great, that all attempts to convert the fibres into fabrics have been abandoned. A very delicate silky fibre is also produced by the *pinna*, a species of shell fish, with which the orientals have succeeded in producing a beautiful fabric. —The earliest historical notices of silk are by Aristotle, Virgil, Horace, Ovid, Pliny, &c. The Chinese silk manufacture, famous in the time of the Roman empire, and for more than 4,000 years ranking next in importance to the production of rice, was no doubt far more ancient than any authentic historical records. Works composed by the Chinese ages ago are still extant, in which all the processes of the manufacture and of the cultivation of the mulberry tree are minutely described and illustrated with woodcuts. In the island of Cos in the Grecian archipelago the coarser fabrics of the Seres were received, and, according to Aristotle, were there first unwoven by Pamphile, daughter of Platea, and converted into the thin transparent gauze afterward known throughout the Roman empire as the *Coa vestis*. It is alluded to by the later poets of the Augustan age, who describe it as sometimes of a fine purple color, and variegated with stripes of gold. The flags attached to the gilt standards of the Parthians, taken in the battles of 54 B. C., were of silk. The Roman victories over these people made more easy the transporta-



tion into Italy of the products of further Asia, and from that period the Seric webs are spoken of instead of the Coan. But highly esteemed as were these fabrics in the courts of Greece and Rome, little was known of the nature of the material itself or of the people that produced it. Aristotle and Pliny speak of the fibre as the product of a caterpillar, but the Roman writers generally regarded it as a downy fleece gathered from trees. When finely manufactured, it was valued at its weight in gold, and the magnificence of the articles of dress was increased by their being interwoven with gold and adorned with fine embroidery, the latter work being executed either in Egypt or Asia Minor. In the reign of Tiberius, to check the increasing extravagance and effeminacy in the use of silk dresses, the senate passed an edict forbidding their being worn by men; and later emperors, like Aurelian, who would not allow his empress a single shawl of purple silk, also sought to put down the prevailing extravagance; while others, as Caligula and Elagabalus, encouraged it by their own adoption of the dress. In A. D. 176 the scarfs and shawls of great value, which during several preceding reigns had accumulated in the wardrobe of the empress, were sold together with other imperial ornaments by Marcus Aurelius to replenish his treasury. This emperor also sent an embassy to China with the view of opening direct trade with that distant country, and thus reducing the cost of its products. But the caravans of the Persians still continued to control the trade, and by monopolizing the sales of silk they kept the prices at exorbitant rates. It was not until the year 530 that the first step was made toward breaking up this dependence upon the Persians, by introducing the manufacture itself into Europe. Two Persian monks, employed as missionaries in China, there learned all the details connected with the production of silk, and, being encouraged by Justinian, brought to Byzantium from "Serinda," supposed to be Khotan in Little Bokhara, some eggs of the silkworm, concealed in a hollow reed. When hatched, the worms were fed upon the leaves of the common or black mulberry, and rapidly increased. The white mulberry was introduced for their better support, and the silk manufacture was soon successfully established, so that in the succeeding reign its management was in no wise inferior to the operations of the Chinese themselves. Thebes, Corinth, and Argos became noted for their production of silk, and until the 12th century the art made no further progress westward; but in 1147, by the victories of Roger, king of Sicily, many of the inhabitants of the Grecian cities who were skilled in it were taken prisoners, carried to Palermo, and soon introduced the rearing of the worm and the manufacture of silk into Sicily. The art thence spread into Italy, and Venice, Milan, Florence, Lucca, &c., were soon distinguished for the beauty of their silks. Bologna also took precedence in the

art, and up to the 16th century silk elsewhere made was sent there to be twisted or prepared for weaving. The silk fabrics of Europe previous to the 13th century were generally of plain patterns, but those imported from Asia were more elaborate, and many resembled in the style of their ornaments the Persian shawls of the present day. The Moors succeeded at an early period in introducing the manufacture into Spain, and a flourishing silk trade was already established at Granada when that city was captured in 1492 by Ferdinand the Catholic. Louis XI. of France in 1480, and Francis I. while the French occupied Milan in 1521, introduced workmen from there for the purpose of establishing the production of silk in France; but the attempts were not successful until 1564, when a gardener at Nîmes had cultivated the white mulberry trees and prepared suitable food for the worms. Soon after this the silk business became permanently established in the southern provinces of France. England thenceforth imported largely the costly silks of France, as she had before done those of Italy and China. James I. of England strongly urged upon his subjects the importance of raising silk worms; but this was abandoned after repeated attempts, the climate being considered unfavorable, though the business is successfully prosecuted in regions quite as cold in northern Germany and in Russia. The manufacture of silk goods, however, made great progress in the reign of James I., and it is stated that in 1686 the trade had become so important as to give employment to as many as 40,000 persons. In 1685 many thousand skilful workmen in various trades were driven from France by the revocation of the edict of Nantes, and among them a large body of silk weavers took refuge in England and settled in Spitalfields, where they established several new branches of the art. The machinery was not adapted to produce organzine silk thread, and in 1718 John Lombe, an ingenious mechanic and draughtsman, in the disguise of a common workman obtained access to the silk throwing mills in Piedmont, and escaped at great risk with the accomplices he had bribed, although an Italian brig was despatched for his capture. On his return he constructed at Derby on the Derwent a silk mill of wonderful dimensions, though greatly inferior in capacity to other establishments now in operation there and elsewhere. It was  $\frac{1}{4}$  of a mile long, 5 stories high, and contained 28,586 wheels and 97,746 movements, which worked 73,726 yards of organzine silk with every revolution of the water wheel. As this revolved 8 times a minute, the daily capacity of the works was 318,504,960 yards. John Lombe died in 1722, poisoned, it is said, by Italian emissaries; but the works prospered, and in 1780, as stated by Keysler, English silk goods sold in Italy at higher rates than those made by the Italians. The manufacture continued to be protected by extravagant duties and restrictions upon the

trade, and upon this protection the artisans appear to have relied rather than upon the exercise of their ingenuity and skill in improving the processes. In 1788 the value of the silk products was rated at the large sum of £3,350,000; still as practised upon the continent the art was far in advance of the English methods. From the parliamentary reports of 1821 it appears that for several years raw silk had been imported from Bengal, China, Italy, and Turkey, to the average extent of 1,800,000 lbs.; and subsequently to this for 8 years the importations of raw and thrown silk had amounted annually to nearly 3,500,000 lbs. More than 40,000 looms were in operation, and £10,000,000 were paid to those employed in the various branches of the business. In 1825 there were 226 throwsting mills running 1,180,000 spindles. At Spitalfields alone there were 17,000 looms in operation. In 1824 and 1826 the restrictions were in great part removed, and foreign silk fabrics were admitted at a duty of 30 per cent. Foreign competition under this check proved beneficial, the machines and manufacture soon underwent great improvements, and in 1842 the value of British silk goods exported to France amounted to £181,924.—Failing to introduce the culture of the silkworm into England, James I. early sought to establish it in the American colonies. He himself forwarded eggs from his own store to Virginia, the mulberry tree was indigenous in the colony, and every inducement in the way of severe penalties and high rewards was offered with the hope of placing the culture upon a permanent footing. It was all in vain, however; for though some silk continued to be made, and Charles II. in 1660 was provided with a coronation robe which was the product of the silkworms of Virginia, the cultivation of tobacco superseded almost every other industrial pursuit, and the silk business gradually declined. In the 18th century the most active efforts were made to establish the business permanently in nearly all the colonies. In Louisiana the cultivation of silk was introduced in 1718 by the "Company of the West." The settlers of Georgia were encouraged by grants of land from the government to cultivate the mulberry tree, and private individuals in England with great liberality coöperated with parliament in affording every aid in fostering the enterprise. Artisans were sent over in 1732 from different parts of Europe to direct the management of the worms and winding of the silk, and trees, seed, and silkworm eggs were abundantly furnished. A public seal was adopted having a representation of silkworms at work, and the motto: *Non sibi sed aliis*—"Not for ourselves, but others." The agent from Piedmont, Mr. Amat, after producing some silk equal to any French or Italian, became dissatisfied, destroyed the machinery, trees, and eggs, and fled to Carolina. He was soon replaced by another Italian, Mr. Camuse, who with his family was engaged at a liberal salary to take charge of a

"filature" in the colony; and in 1734 the first export of raw silk, amounting to 8 lbs., was made to England, Gen. Oglethorpe himself taking it. More was sent the next year, and being manufactured into organzine by Sir Thomas Lombe, it was so much admired that a dress was made of it for Queen Caroline, in which she appeared at the court levee of the king's birthday. The Saltzburger at their settlement called Ebenezer, on the Savannah, engaged with great zeal in the enterprise, in which they were encouraged by the active interest of their pastor, Mr. Bolzius. Sheds for reeling were erected near his house, and young women who learned the art of reeling were rewarded by the liberal bounty offered by the trustees of the colony. In 1749 the production had amounted to over 1,000 lbs. of cocoons, and the silk was so well reeled that it commanded in London the highest prices. In 1750 the trustees sent two commissioners, Mr. Pickering Robinson and Mr. James Habersham, to promote more effectually the silk culture in Georgia. They erected the next year in Savannah a public filature or silk house, to instruct in the management of private filatures. In 1752 Mr. Joseph Ottolinge, an accomplished Piedmontese reeler, succeeded Mr. Robinson. At the end of 1754 the exports of raw silk for the 4 preceding years amounted in value to \$3,880, and for the next 18 years the annual exports averaged 546 lbs. The cocoons delivered at the filature in 1757 were 1,050 lbs.; in 1758, 7,040 lbs.; in 1759, 10,000 lbs.; in 1760, 15,000 lbs.; and in the next 8 years they amounted altogether to nearly 100,000 lbs. It was, however, by the encouragement offered to the production by the bounties of the government and of the society of arts of London that the business was sustained; for when parliament in 1766 reduced the price of cocoons from 3s. (one half of which had been in the way of bounty) to 1s. 6d., the production rapidly declined from 20,000 lbs. of cocoons in 1766 to 290 lbs. in 1770. Had this reduction in the bounty been gradual instead of sudden, the effects would probably not have been so serious. In 1769 the bounty was renewed and the business partially revived, but it was entirely broken up by the revolutionary war. In 1790 was offered for sale the last lot of Georgia silk of 200 lbs. The experience of the last century fully proved the adaptation of the soil and climate of the southern states to the production of silk; and though the culture afterward gave place to the great southern staple, cotton, it is not impossible it may yet be restored, and raised to even greater importance than that originally anticipated for it. In South Carolina silk growing was practised before the revolution, both as a fashionable occupation and as a business, the latter by the Swiss settlers at Perrysburg, and also by the French, who wrought it up with wool into fabrics. In 1755 Mrs. Pinckney, mother of the revolutionary generals of that name, took to England a quantity of excellent

silk she had made and spun, and of it were made 3 complete dresses, one of which was presented to the princess dowager of Wales, and one to Lord Chesterfield. In 1765, 630 lbs. of cocoons were raised upon a plantation in St. Thomas parish, which had been known by the name of Silk Hope ever since 1698, when Gov. N. Johnson had made some successful experiments there in the culture of silk. Though some progress continued to be made in the business, it was at last brought to an end by the same causes that broke it up in Georgia. In Connecticut the culture of silk was also undertaken at an early period, and was encouraged by the home government as in the other colonies. The first silk coat and stockings of New England production were worn in 1747 by the governor, Mr. Law, and in 1750 his daughter was furnished with the first dress. President Stiles of Yale college took great interest in the pursuit for nearly 40 years, and kept a manuscript journal of his observations, which is now in the library of the college. Dr. Aspinwall succeeded in establishing the business in Mansfield, Conn., where it is still carried on, and before the revolutionary war it was already in a very promising condition. A company was incorporated in 1788 to manufacture silk cloth in the state; and the same year President Stiles appeared at the college commencement in a gown woven from Connecticut silk. The next year about 200 lbs. of raw silk, worth \$5 per lb., were made at Mansfield; it was mostly manufactured into stockings, handkerchiefs, ribbons, buttons, and sewing silk worth \$1 per oz. In 1790 about 50 families in New Haven were engaged in the business, and in Norfolk about 80 families raised and spun 1,200 "run of silk." In 1839 the product of Mansfield and its vicinity is reported to have been about 5 tons of raw silk. In Massachusetts attention was also directed to the silk culture in the latter part of the last century. In Boston there was a provincial manufactory, which in 1770 was granted to William Mollineau for 7 years rent free, he agreeing to give employment to the poor in spinning, dyeing, and manufacturing raw silk, for which object he had already expended considerable sums in furnishing machinery to the province factory house. The town of Ipswich was noted in the manufacture of silk and thread lace, and in 1790 produced 40,000 yards of the latter. In Northampton the breeding of the worms has been successfully prosecuted during the present century, and the finest nursery of mulberry trees in the United States was probably that of Dr. Stebbins of that place. A bounty was paid by the state of Massachusetts to the cultivators, and the product increased from \$71 in value in 1836 to \$2,111 in 1841. In Maine, and in various towns in the extreme N. of Vermont and New York, several persons have assiduously devoted themselves of late years to the production of silk, and with encouraging success; but there is little probability of the busi-

ness becoming of importance in localities so far north. In other portions of New York various enterprises of the kind have at different times been undertaken. The business was introduced in 1841 into the state prison at Auburn, and the first year the convicts produced sewing silk to the value of \$12,762. Before the revolutionary war the silk culture received much encouragement in Pennsylvania and New Jersey from the English government, from the London society, and from Dr. Franklin and other influential citizens. A filature was opened in 1770 at Philadelphia, and in 1771 from June to the middle of August it received 2,800 lbs. of cocoons. Mrs. Susannah Wright of Columbia, Lancaster co., received a premium for a piece of silk, 60 yards long, made from cocoons of her own raising, and used for a court dress for the queen of Great Britain. Specimens of this are preserved in the manuscript annals of Mr. Watson by the Philadelphia library company. The philosophical society published in the 2d volume of their "Transactions" an essay containing full instructions for cultivating this branch of industry, which seemed to be well established when it was summarily brought to an end by the war. Attempts were afterward made to revive it, especially by Dr. Aspinwall of Connecticut, who still retained his interest in it, and who planted a nursery of Italian mulberries on Poplar lane in Philadelphia, and another at Princeton, N. J., to replace those destroyed by the British army. In some of the interior towns of Pennsylvania, as Washington in the S. W. part, silk is still produced to a moderate extent, and not only converted into sewing silk, but also woven. In Ohio, the E. parts of Kentucky and Tennessee, and N. Georgia, the production has proved well adapted to the soil and climate, and many have anticipated for it a great success in this portion of the country. There seem in fact to be no natural obstacles to the prosecution of the business over all the middle and southern portion of the United States. Several species of mulberry, quite as well adapted for feeding the worms in the early stages of their growth as the white mulberry, grow wild from Pennsylvania southward, and are easily cultivated in other districts. The foreign species of the tree have also been introduced, and are now almost as well known as the native sorts. Though many of the processes are conducted by elderly persons, women, and children, the rearing of the worms demands the most faithful care and constant attention during the period of the feeding, and must be controlled by competent persons. Whether the labor is more poorly repaid than that devoted to other pursuits, or whether it is not so generally attractive to the people, the business is far from being in a flourishing condition. It was checked by an extraordinary speculative mania started in 1830 in the *morus multicaulis* tree, which extended over a large portion of the United States, and which after it had subsided left a degree of

odium attached to the whole business, from which after the expiration of 80 years it has not yet entirely recovered. The total product of silk raised in the United States in 1840 was reported at 61,552 lbs., worth about \$250,000. In 1844, according to the report of the commissioners of the census, it was 396,790 lbs., worth \$1,400,000; but in 1850 it was only 14,763 lbs. The silk product is universally admitted to be superior in quality to much of the European, and is not surpassed by the Chinese. The climate is particularly well adapted for rearing the worms, which can be fed more generally in the open air than in Europe, and are consequently much healthier than there. While about one half of the worms are there unproductive from disease, the proportion here is only about one fourth.—**SILK MANUFACTURE.** The common silk fibre differs from that of other textile fabrics in being originally obtained in long lengths, and is consequently converted into threads by simple doubling and twisting without the preparatory operations common to the treatment of the short fibres. Some sorts of silk, however, as already noticed, are treated like cotton, and so are the glossy envelopes of the cocoons and the waste of the several processes. The cocoons consist of the sheath of loose filaments attached to the twigs that support the whole, and beneath this the external coat of soft flossy silk, within which is the compact oval ball, or cocoon proper. The thread, as laid by the worm in successive coats in his constantly diminishing tenement, is not wound regularly around the inside of the hollow ball, but is passed back and forth in one place after another in such manner that many yards may be wound off without turning over the ball. It is produced through two orifices in the nose of the worm, and the two fibres on issuing forth are secured together by the glutinous matter which accompanies them and forms nearly  $\frac{1}{4}$  of their weight. The average size of each one of the primary fibres is about  $\frac{3}{16}$  of an inch. Raw silk consists of any number of the double filaments slightly twisted and agglutinated together to form one thread, called single. This is commonly of a golden yellow color, of specific gravity 1.3, and is the strongest of all fibres used for weaving, threads made of it being 3 times stronger than those of the same size made of flax, and twice as strong as those of hemp. The cocoons after their completion, which occupies the worm 3 or 4 days, are collected together and assorted. Some of the best are kept for breeding, some are set aside for working up with the waste, and the others are classified according to their qualities, each sort properly being worked by itself. Before the chrysalis matures and the moth can begin to eat his way out, the cocoons are exposed to a moderate degree of heat, either in an oven, or in a steam bath, or in water heated to about 200° F. The heat of the sun will sometimes effect the desired purpose, which is to destroy

the life of the insect. This is ascertained by opening a few cocoons that were least exposed to the heat, and seeing if the chrysalids manifest signs of life when pricked with a needle. The floss covering being opened at one end, the cocoon is slipped out, and is then ready to be unwound. This operation, which should be conducted by skilful operatives, is best managed in the silk factories or filatures, to which the cocoons raised in the neighborhood are brought for sale. The machinery may be merely sufficient to run the requisite number of reels, and an apparatus is required for boiling water and furnishing steam heat. Each reel is adapted for winding off the fibres from 20 or 30 cocoons, and several are tended by one operative, usually a woman. The cocoons are placed about 5 together in each one of 4 compartments in a sort of trough or basin holding hot water, which is kept at the necessary temperature by a steam pipe. The gummy matters are softened by the water, and the fibre is thus released. The ends are caught up by a little sort of broom with which the cocoons are stirred, and those from each compartment being brought together are passed through an eyelet, which strips off a portion of the gum, and still more is rubbed off by causing the threads formed by each bundle of fibres to cross and rub against each other, as they are conducted in a diagonal manner through a succession of eyelets toward the reel, just previous to reaching which all are united in one thread. That the gum still remaining with the fibres may not cause the threads to stick together when wound, the reel is set so far from the bath that the gum has a chance to harden in the intervening space; and the precaution is also taken in winding to lay the threads on the reel in regular spirals, moving from one end to the other, so that no thread is overlaid by another until the whole length of the reel has been thus gone over. To preserve uniformity in the size of the thread, it is necessary to add new cocoons before the first have been quite unwound; for in the inner portions the fibre grows materially finer. This is one of the points demanding constant attention in this process, and requiring both experience and good judgment. It is also essential for the production of good silk, that can be expeditiously and economically carried through the succeeding operations, to faithfully attend to several other points; as keeping the water at just the right temperature, so that the fibres may run off without difficulty, and yet not too freely in bunches together; fastening the ends together when the threads break by tying, and not leaving them loose; and keeping threads of different sizes upon separate reels. In Middleton and Manchester, England, the silk has been twisted into thread of any required size and cleansed in the unwinding of the cocoons. The reeling was thus dispensed with, and according to the English reports more uniform thread was produced with less waste, and the sub-

sequent operations were greatly simplified. The plan was never adopted in the United States, and is said to be now abandoned in England. Cocoons of good size yield about 300 yards of filament, and some even 600 yards. From 240 to 250 are usually allowed to a pound, and 11 or 12 lbs. of cocoons to 1 of raw silk, or about 2,800 cocoons. The raw silk taken off from the reels is in China made up into bundles, called books, for exportation, and elsewhere the hanks are simply twisted so as to hold snugly together. They are then ready for the factory of the silk throwsters, where are conducted the operations connected with the throwing, a term variously used to express the putting a twist into fibres. The number of these operations, all of which are also classed by the general term throwing, varies according to the intended use of the silk. For bandanna handkerchiefs the only preparation of the silk is winding the hanks and cleaning; bleaching is added for silk intended for gauze and similar fabrics. Winding, cleaning, and throwing prepare it, under the name of thrown singles, for ribbons and common silks. If simply doubled before throwing, it is known as tram, and is used for the wool or shoot of gros de Naples, velvets, and flowered silks. The twisting of each strand before doubling, as well as afterward, converts it into organzine, a strong thread suitable for warp. If the natural gum is allowed to remain, the silk is termed hard; but if it is removed by scouring, it is termed soft. The winding is done from light 6-sided reels called swifts, upon which the hanks, first washed in soap and water, are extended, and rows of which are set upon long shafts in an iron frame and connected each with its own bobbin, upon the top of the frame. The revolution of the latter carries around the reel beneath, and the movement is properly checked and regulated by appliances to the reel. The next process is that of cleaning the threads, which is effected upon the cleaning, drawing, or picking machine. The full bobbins are set horizontally upon plain spindles, from which each thread is conducted over an iron or glass guide rod, thence through an adjustable opening between two upright iron blades of an instrument called the cleaner, and then to the empty bobbins, which by their revolution wind it off from the full ones. Knots and other irregularities are stopped by the cleaner, and if not brushed off they stop the movement of the bobbin until they are removed by hand. The spinning or rather twisting process, which succeeds the cleaning, is conducted by means of machines similar to those used for the same purpose in cotton spinning, the thread passing from the full bobbin to the empty one, upon which it is wound as it is twisted by means of the flyer, through the eye of which it passes, and which revolves rapidly round the bobbin it is filling. Doubling is the process of bringing two or more of the twisted threads into one and winding this. The chief feature of interest in it is the

contrivance by which the winding bobbin is instantly stopped if one of the threads breaks. The bobbins of doubled thread are next twisted at the spinning frames, which completes the preparation of silk thread whether for sewing or weaving purposes. The American machines for doubling and twisting are much superior to those used in England, but for winding the same are employed in both countries. The thread is colored by dyeing after the gum has been removed from it by boiling for 3 or 4 hours in soap and water. It loses about  $\frac{1}{4}$  its weight by this operation, but recovers nearly half the loss in the dye stuff it absorbs.—Waste silk is prepared for spinning by first hackling in the same manner as flax is hackled, and with the same sort of hand instrument. This is followed by machine hackling upon the filling engine, which more effectually combs out the filaments and removes the impurities. The sliver of parallel fibres is then chopped into lengths of about  $1\frac{1}{2}$  inches, which after scutching, as in the treatment of cotton, are converted into a sort of fine down. This is put into bags and boiled, first with soap and water for an hour and a half, and afterward with pure water. It is then powerfully squeezed under a Bramah press, dried by artificial heat, and again scutched. The succeeding operations of carding, drawing, and roving by the fly frames, and spinning by the spinning mill and throstle frames, are similar to those practised in the manufacture of cotton yarns. The product is adapted for the manufacture of shawls, bandanna handkerchiefs, and similar fabrics. The consumption of waste is very large in Great Britain, the importations in 1856-'8 amounting to 2,069,684 lbs.—The importations of silk into the United States for the year ending June 30, 1860, were as follows: raw silk, \$104,700; sewing silk, \$154,572; twist, \$80,414; floss, \$12,903; piece goods, \$24,876,075; caps, bonnets, and hats, \$95,529; hosiery, and articles made on frames, \$546,845; manufactures not specified, \$5,001,406; total, \$30,872,444, beside piece goods of silk and worsted to the amount of \$2,193,376. Of the total imports, \$17,211,109 were from England, \$13,093,724 from France, \$1,600,432 from the Hanse towns, \$906,929 from China, and \$150,696 from New Granada.

SILK, VEGETABLE. See PULU.

SILKWORM, the larva of a lepidopterous insect, of the moth division, family *bombicidae*, and genus *bombyx* (Schränk). Of all the silk-producing larvæ, that of the common silkworm (*B. mori*, Schränk) is the most important, as from it is obtained all the European and most of the Chinese silk. The moth is about an inch long and 2 in alar extent, of a whitish or pale yellowish color, with 2 or 3 obscure streaks and a lunate spot on the upper wings; the trunk is very short; the superior wings decumbent, and the inferior extending almost horizontally beyond them; the antennæ of the males are pectinated; the males fly swiftly in the evening and sometimes by day, but the fe-

males are inactive; they live but a few hours after the eggs are deposited on the mulberry trees. The eggs are about the size of mustard seeds, and the young emerge in a few days if the weather or air of the breeding-room be warm and dry; when first hatched they are 1 or 2 lines long, of a dark color, and commence very soon eating voraciously, with short intervals of abstinence during the moultings, until full grown, when they are about 3 inches long, of a light green color, with darker marks, blackish head, and fleshy protuberance on the last joint but one; there are 12 segments to the body, 9 stigmata or breathing holes on each side, and 16 legs, of which the anterior 6 are hooked, and the others, including the 2 on the last segment, end in disks; the mouth has a vertical opening, with strong and serrated jaws; the stomach is very large, as would be expected in such a voracious larva. It lives exposed in the wild state, but none of the Chinese or European worms are allowed to incur the risks of life in the open air. According to the experiments of Count Dandolo, 100 newly hatched silkworms weigh 1 grain, after the first moult 15, after the 2d 94, after the 3d 400, after the 4th 4,628, and at full size 9,500 grains; each consumes an ounce of mulberry leaves during these stages, about 60,000 times its primitive weight, and its length increases from 1 to 40 lines during the same period; by calculation the product of an ounce of eggs eats upward of 1,200 lbs. of leaves, and should furnish 120 lbs. of cocoons. Like most other caterpillars, it changes its skin 4 times, at intervals depending on the temperature and on the quantity and quality of the food; if kept at 80° to 100° F. it moults in half the time required at ordinary temperatures. As usually treated, the 1st moult takes place on the 4th or 5th day after hatching, the 2d begins on the 8th, the 3d takes up the 13th and 14th, and the last happens on the 22d or 23d day; after this the 5th age lasts 10 days, making about 32 days for the whole process to maturity. The appetite increases with the size till after the 4th moult; during the last 10 days the silk gum is elaborated, the appetite diminishes, and the larva begins to spin its cocoon in some convenient place. The spinning apparatus is placed near the mouth and connected with the silk bags, which are long, slender, and convoluted organs, containing a liquid gum; they are closed below, and end above in slender tubes, one on each side, which unite to form the single spinning tube; the gum from which the silk is produced on contact with the air is elaborated by the long glandular organs; every thread of silk is made up of 2 strands. It is customary to supply to the worms a piece of rolled paper, or some hollow substance into which they can retire, or a convenient twig, for the formation of the cocoons. They first make an outer covering of floss silk to keep off the rain; within this they spin fine silk, bending the head and body up and down and cross-

ing to every side, entirely surrounding the body as a protection against wind and cold; and within this is a more delicate silk, glued firmly together for the inner chamber, resisting both cold air and water. After building the cocoon the larva is transformed into a chrysalis, and comes forth a moth, easily bursting through the case, the silk, and the floss. The cocoon resembles a pigeon's egg, and is from 1 to 1½ inches long, and of a bright yellow color; the moth emerges from it in from 15 to 56 days, according to temperature, the former being the time in the southern United States; 18 to 20 days is the time in Connecticut, 8 weeks in France, and 5 to 6 in England; the cocoon is made in from a few hours to 2 or 3 days, and is more pointed at one end than the other; the silk is not interwoven nor the glue applied at the pointed end, toward which the head is always placed. The chrysalis has no spines nor serrations on the edge of the abdominal rings, has a skin of leathery consistence, and the stomach filled with a yellowish nutritive fluid; the organs of the moth are gradually developed, and in 2 or 3 weeks the skin of the chrysalis gives way, the moth escapes into the cocoon chamber, and readily sets itself free, leaving within the remains of its former covering. In the wild state the cocoon is made about the middle of June. The silk from the cocoons containing males is finer and more tenacious than that from the female cones. It is fortunate that the threads do not adhere as they do in the cocoons of many other larvæ, else the operation of unwinding would be very difficult if not impracticable; even in the *B. mori* the silk is sometimes coarse and adherent, when the quality of the food has not been good. Like other caterpillars, the silkworm sometimes makes mistakes, and 2 or 3 are occasionally shut up in a single cocoon, in which they undergo metamorphosis perfectly well. The usual way of throwing the cocoons into boiling water kills the chrysalis; but by merely steaming them over boiling water the glue is softened so as to allow the unwinding of the silk, and permits the moth to come forth alive from the interior layer and deposit the eggs or prepare for a new brood.—The whole secret in raising the silkworm consists in securing for it warmth, dryness, plenty of proper food, and pure air. The mulberry tree, whose leaves constitute the food of the silkworm, requires for its perfect growth long continued dry and warm weather, and suffers in the rainy seasons of England and France; it is said to have no insect feeding upon it but the *bombyx*, whence it has been stated that the tree and the insect were created for each other; it exhausts the earth where it is planted, as far as any other vegetation is concerned; one tree of the *M. multicaulis*, it is computed, will feed as many silkworms as would produce annually 7 lbs. of silk. Silkworms are very tender and liable to perish from slight changes of temperature and dampness, from foul air, and improper or insufficient

food; the periods of the moultings are to them times of sickness and danger; great destruction is caused by a disease called muscadine, which is a minute fungus (*botrytis Bassiana*) occupying the interior of the body and bursting through the skin. The disease called the "reds," manifested by red stains and blotches on the skin, is ascertained to be due to some acid, resulting from disordered digestion; the larvæ seem cramped and stupefied, the rings dry up, and they look like mummies.—The larvæ of several large moths of the genus *saturnia* (Schrank) form cocoons from which silk is obtained; among these are the arrindi silkworm, *S. Cynthia* (Schr.), of India, and the *S. mylitta* (Schr.), whose moths have an alar expanse of about 8 inches, and appear to be the wild silkworms of the East. The *S. mylitta* abounds in Bengal, and yields much coarse and dark-colored silk, highly prized by the Hindoos; it cannot be domesticated; the natives catch the caterpillars, put them on the asseem trees, and guard them from birds by day and bats by night; the natural food is the *rhamnus jujuba*. The *S. Cynthia* is domesticated in the interior of Bengal, on leaves of the castor oil plant (*ricinus communis* or *palma Christi*) and of the *ailantus glandulosa*; the cocoons are generally about 2 inches long and 3 in circumference, whitish or yellowish, of soft and delicate texture.

SILLIMAN, BENJAMIN, LL.D., an American physicist, born in North Stratford (now Trumbull), Conn., Aug. 8, 1779. His father, Gen. Gold Selleck Silliman, was a lawyer of distinction, and rendered important service as a brigadier-general in the war of the revolution. Mr. Silliman was graduated at Yale college in 1796, and in 1799 was appointed tutor. He studied law and was admitted to the bar of New Haven in 1802. Chemistry as a science was then almost unknown in America, being taught, even in its rudiments, only at Philadelphia and Cambridge; but the brilliant discoveries of Lavoisier, Sir Humphry Davy, and others, had attracted much attention. Dr. Dwight, then president of Yale college, became interested in its introduction into the college course as a regular department of instruction, and with that view offered to Mr. Silliman in 1802 the new chair of chemistry. He consented to abandon his profession and accept it, if he could be allowed time and opportunity for preparation for its duties. He accordingly passed a part of the next two years in Philadelphia, as a student with Dr. Woodhouse, and on his return to New Haven in 1804 delivered a partial course of lectures on chemistry to the students of the college. In the winter of 1805 he gave his first full course of lectures, and in the spring sailed for Europe to prosecute still further his studies in physical science, and to procure books and apparatus for the college for the illustration of chemistry and physics. He visited the mining districts of England, attended the lectures of eminent professors in London and

Edinburgh, and attempted to visit France, but was stopped at Antwerp under the false charge of being an English spy. He returned after an absence of 14 months, and resumed the duties of his professorship. His narrative of his tour was published in 1810 under the title of "Journal of Travels in England, Holland, and Scotland in 1805-'6" (2 vols. 8vo.; enlarged ed., 3 vols. 12mo., 1820), and, being one of the earliest accounts of Great Britain by an educated American, attracted much attention on both sides of the Atlantic. Not long after his return he made a geological survey of a part of Connecticut, which is believed to have been the first of these explorations made in the United States. In Dec. 1807, a meteorite of great size and splendor passed over New England, and threw off large fragments with loud explosions in the town of Western, Conn. Profs. Silliman and Kingsley visited the town as soon as possible after hearing of the occurrence, and succeeded in procuring some fragments and in ascertaining the facts relative to their fall. Prof. Silliman then made a chemical analysis of the meteorite, and published the earliest and best authenticated account of the fall of a meteorite in America. He afterward assisted Dr. Robert Hare in his experiments with the oxy-hydrogen blowpipe, to which he gave the name by which it is now generally known of "compound blowpipe." With this instrument he first effected the fusion of several bodies which had previously been regarded as infusible, particularly lime, magnesia, and some of the other earths with metallic bases. In 1813 he published in the "Memoirs of the Connecticut Academy of Arts and Sciences" an account of his experiments, by which he had greatly extended the list of bodies known to be fusible. In 1812, by his personal influence with the late Col. George Gibbs, he secured to Yale college the then unrivalled mineralogical and geological collection made by that gentleman in Europe; and he exerted himself with great success to give full effect to the sciences of mineralogy and geology. Immediately on the receipt of the account of Sir Humphry Davy's discovery of the metallic bases of the alkalis, Prof. Silliman repeated his experiments, and obtained, probably for the first time in the United States, the metals potassium and sodium, by the furnace process of Gay-Lussac. In 1822, while engaged in a series of observations on the action of a powerful voltaic deflagrator on the model of Dr. Hare, he first established the fact of the transfer of particles of carbon from the positive to the negative electrode of the voltaic apparatus, with the corresponding growth of the negative electrode, and the retransfer when the charcoal points are shifted. This fact, with the fusion of the carbon in the voltaic arch, was one long disputed in Europe, but is now generally recognized. In 1818 Prof. Silliman founded the "American Journal of Science and Arts," better known both in Europe and Amer-



ica as "Silliman's Journal," with which his name is still connected, and of which for 20 years he was sole, and for 8 years more senior editor. This journal, at first a quarterly, but now a bi-monthly periodical, has for 43 years been recognized at home and abroad as the chief repository of American physical science. In 1838 his son, Benjamin Silliman, jr., became associated with him in the editorship of the work, and in 1846 it was transferred by the senior editor to Profs. J. D. Dana and B. Silliman, jr. Prof. Silliman was one of the earliest American lecturers on scientific subjects to large miscellaneous audiences. He had for many years given public lectures in New Haven, on chemistry, geology, and allied topics, to audiences of citizens, and with excellent effect in promoting a taste for science and a desire for its advancement. In May, 1834, he was invited to Hartford, to deliver a popular course on scientific subjects, and in September following to Lowell. In 1835 and 1836 he gave more extended courses in Boston and New York. In 1839 he opened the Lowell institute of Boston by a course on geology, and in the 3 succeeding years followed with courses on experimental and theoretical chemistry in the same institution. He has also delivered repeated courses of popular lectures in Boston, Lowell, Salem, New York, Philadelphia, Baltimore, Buffalo, St. Louis, Mobile, and New Orleans, many of them illustrated by brilliant and interesting experiments. In 1830 Prof. Silliman published a text book on "Chemistry," in 2 vols., for the use of his students; and in the previous year he had published an edition of Bakewell's "Geology" with notes and appendices, which in the course of 10 years passed through 3 editions. An account of a journey between Hartford and Quebec, made before the modern conveniences of travel were introduced, also appeared from his pen in 1820. In 1851 he again visited Europe after an interval of 45 years, and spent 6 months there. The narrative of this journey, replete with scientific observations, was published in 1853 under the title of "A Visit to Europe in 1851" (2 vols. 12mo., New York), and has passed through 6 editions. In 1853 he resigned his professorship, and was made professor emeritus; but at the request of his colleagues he continued to lecture on geology till June, 1855, when he gave his closing academic course. The simplicity and moderation of Prof. Silliman's physical habits and his constant activity have contributed to give him a firm and vigorous old age, free from mental or bodily infirmity; and though now (1862) in his 83d year, he still takes a deep interest in the progress of science, humanity, and freedom, at home and abroad. He is a member of numerous American and European scientific societies.—BENJAMIN, jr., an American physicist, son of the preceding, born in New Haven, Conn., Dec. 4, 1816. He was graduated at Yale college in 1837, was an instructor there in chemistry, mineralogy, and geology from 1838 to 1847,

and in 1842 opened a laboratory for instruction in analytical chemistry. In 1846 he was appointed professor of chemistry applied to the arts in the scientific school of the college, now the Sheffield scientific school, the organization of which was in a great degree owing to his efforts. He became associate editor of the "American Journal of Science," with his father, in 1838, and in 1854 was associated with Prof. Dana as editor and proprietor. From 1849 to 1854 he was professor of medical chemistry and toxicology in the medical department of the university of Louisville, Ky.; and in 1854 he succeeded his father as professor of general and applied chemistry in Yale college, which position he still holds. In 1853 he had charge of the departments of chemistry, mineralogy, and geology in the crystal palace exhibition in New York, and in connection with Mr. C. R. Goodrich prepared the "Illustrated Record" and the "Progress of Science and Art" published in connection with that exhibition. In 1851 he had visited Europe with his father, and prepared from his notes the "Visit to Europe" published in 1853. He was for a number of years secretary of the American association for the advancement of science, and had charge of the publication of its "Proceedings." He has also for many years been widely known as a popular lecturer on scientific topics, and in his native city as the active promoter of public improvements. Beside about 60 papers in the "American Journal of Science," he has published "First Principles of Chemistry," a popular text book (Philadelphia, 1846; revised in 1850), and "Principles of Physics" (Philadelphia, 1858; 2d ed., 1860).

SILURIAN, a name proposed by Sir R. I. Murchison for the lower series of the fossiliferous rocks, reaching up to the old red sandstone. (See GEOLOGY.) He found these formations largely developed in a portion of Wales and of England, which was once the kingdom of the Silures, a tribe of ancient Britons, and hence gave their name to the series.

SILVER, one of the precious metals, distinguished by its pure white color, the brilliant lustre it acquires by polishing and burnishing, its malleability, and its resistance to the action of atmospheric oxidating agents. As a chemical element its symbol is Ag, from the Latin *argentum*; its equivalent is 108; specific gravity 10.47, or when hammered 10.54. In hardness it is between copper and gold, so that it is easily cut with a knife; but alloyed with a little copper, it is considerably harder. Its tenacity is greater than that of gold, and less than that of platinum, copper, or iron. In malleability it is inferior only to gold, leaves being obtained by beating of less than  $\frac{1}{1000}$  of an inch in thickness, and wires also are drawn out of extreme tenuity. Silver melts at a full red heat, about 1,870° F., and in this condition it absorbs oxygen mechanically to the extent of 22 times its own bulk; but in solidifying it expels the gas, sometimes with force sufficient to

throw off particles of the metal itself. This often occurs in the process of cupellation. Silver when highly polished reflects light and heat more completely than any other metal, and this property is so remarkable that the metal is not melted in the focus of a mirror by which platinum itself is fused. Another effect of the same property is a low radiating power, and the polished metal consequently retains heat better than other substances, whence its general preference for teapots and other vessels designed for retaining heated liquids. Crystals of silver may be obtained by melting a quantity of the metal, and, when a crust is formed in cooling, pouring out the liquid portion from the interior; this will then be found lined with crystals of cubic and octahedral forms. By repeated heating and cooling silver assumes a crystalline and brittle condition. Though not oxidized by exposure to dry or moist air at any temperature, it is tarnished by the small quantities of sulphuretted hydrogen usually present, especially in the atmosphere of cities, and a thin film of sulphuret of the metal is formed upon its surface, which is removed with difficulty. The usual solvent for silver is nitric acid, which acts upon it rapidly even when diluted with an equal bulk of water. From its solution it is thrown down by chlorine employed in the state of hydrochloric acid or a chloride salt, as common salt, and in this way is readily separated from various metallic combinations. The insoluble chloride of silver may be decomposed and the metal recovered pure by mixing it with  $\frac{1}{7}$  of its weight of carbonate of lime and half its weight of carbon, and exposing the mixture to a white heat in a crucible. It may be treated in the same way with  $\frac{1}{2}$  its weight of black rosin, heating moderately so long as the flame is greenish blue and then suddenly increasing the fire and melting the ingot. Silver is scarcely affected by the alkalis, whether these are in solution or fused; and it is consequently a good material for crucibles in which refractory minerals in analysis are fused with caustic potash. The beauty and cleanliness of the metal, and its being scarcely affected at all by substances used as food (excepting eggs only, in consequence of the sulphuretted hydrogen they contain), have always rendered silver a favorite material for plate and for a variety of ornamental articles in domestic and ceremonial uses. Its ornamental effect is increased by the different sorts of work applicable to the metal, as raised work, chasing, filigree, &c., and especially by the contrast between the brilliant burnished surfaces alternating with the intense whiteness of the matted or dead work. From the earliest historical periods it has been the common medium of exchange, and is now used as such among all nations who recognize a metallic currency. Both coins and plate made of it are hardened and rendered more durable by a slight admixture of copper. From its great capacity of reflection it is superior to all other substances for the re-

flectors of lighthouses.—Silver is one of the first metals named in the Old Testament, and with gold it is mentioned among the valuable possessions that constituted the riches of Abraham. Even in his time it was used in barter, Abraham purchasing the field of Ephron for 400 shekels of silver, which were weighed out and designated as "current with the merchants," referring probably to their being of the requisite fineness. In the book of Job the distinction in the manner of obtaining silver from veins and gold from superficial deposits is noticed in the passage translated: "Surely there is a vein for the silver, and a place for gold where they fine it." The use of silver as a medium of exchange is indicated in the sale of Joseph by his brothers for 20 pieces of money, or, as rendered in the Septuagint, of silver, the Hebrew word *kussuf*, like the French *argent*, signifying either money or silver; and in the time of the famine Joseph is said to have accumulated all the silver of Egypt and of Canaan in exchange for corn. As among the Egyptians the word for silver means "white gold," Wilkinson supposes that gold was first known and used for money; and this appears reasonable also from the fact of the gold being obtained always in a metallic state, while silver must commonly be separated from ores in which the metal is concealed, and the working of which demands some metallurgical skill. The Egyptians and Hebrews were well acquainted with both, and employed them for a variety of purposes, as for jewels; gold and silver jewels were brought by Abraham's servant to Rebecca. They were also made into vases, rings, trinkets, and fine wire for embroidery and for weaving. The money was in the form of rings, and this is still its shape in Sennaar. Coins were first made and stamped, according to Herodotus, by the Lydians; but the oldest Greek coins are the silver ones of Ægina, with a tortoise on one side. In the time of Solomon silver is said to have been so abundant as to be nothing accounted of, and the king had made it to be as stones in Jerusalem. By other nations of antiquity also silver was possessed in great profusion. In Ecbatana, as described by Polybius, it was largely employed together with gold in the form of plates for covering the beams and pillars of the temples, and the tiles upon the roofs were of solid silver. The metal was obtained together with gold from various countries, as Nubia, Ethiopia, Attica, Epirus, and also from the distant countries of eastern Asia. The wealth of the Spanish silver mines was developed at a very early period, and was the principal support of the extensive commerce long carried on with the Phœnicians, Carthaginians, and Romans. Pliny describes the opening of rich mines by Hannibal, one of which had supplied him with silver to the amount of 300 lbs. weight daily, and was worked by horizontal tunnels reaching a mile and a half into the mountain. This was at Guadalcanal at the foot of the Sierra Morena, in the modern province of Cordova. For several

centuries after the fall of the Roman empire little attention was given to mining operations, and until the 16th century nothing more is known of the silver mines of Spain except that they afforded much silver to the Arabs.—The value of silver as compared with that of gold has varied greatly at different periods. M. Léon Faucher is of opinion that originally silver in some countries was worth quite as much if not more than gold. By the laws of Menes the value of gold was fixed at  $2\frac{1}{2}$  times that of silver. In the 5th century B. C. throughout the East gold was worth 6 to 8 times as much as silver. In Greece, according to Herodotus, their relative values were as 18 to 1; and in the time of Plato and Xenophon as 10 to 1, which long continued to be the case. Occasional fluctuations occurred from temporary and local causes, such as could now in the more general and rapid intercommunication of nations have no influence in disturbing the equilibrium of the rates. The abundance of silver obtained from Asia, Thrace, and Spain during the Roman empire caused its value to depreciate in the time of Theodosius II. to  $\frac{1}{4}$  of that of gold; but during the middle ages and down to the 16th century, when there was a deficiency of the skill required for working the silver ores, the value of the metal was  $\frac{1}{2}$  and  $\frac{1}{3}$ , and even  $\frac{1}{10}$  that of gold. The effect of the discovery of the mines of the new world was to reduce the value of silver, which fell as low as  $\frac{1}{10}$  that of gold in the latter part of the 17th century. In the 18th century it rose to about  $\frac{1}{3}$ , and in the commencement and the middle of the 19th the relative values of the two metals have fluctuated from 15 to 15.5 to 1.—Silver forms three oxides, a suboxide ( $\text{Ag}_2\text{O}$ ), a protoxide ( $\text{AgO}$ ), and a peroxide ( $\text{Ag}_2\text{O}_2$ ). The protoxide is of special interest as the basis of the salts of the metal. It is separated from the nitrate or any soluble salt of silver by addition of an alkaline solution. The precipitate is a brown hydrated oxide, which parts with its water at  $140^\circ\text{F}$ . and with its oxygen at a red heat. It dissolves in ammonia, and the solution by exposure to the air deposits a black micaceous powder of very explosive character, known as fulminating silver. This most dangerous compound may also be unintentionally produced by precipitating an ammoniacal solution of nitrate of silver by the addition of potash. Another explosive compound of silver is described in the article FULMINATES.—With nitric acid the oxide of silver forms the most important salt of this metal, the nitrate,  $\text{AgO NO}_2$ . The solution, if pure, is clear and colorless, but it is immediately stained by the presence of an organic substance, and then by exposure to the light becomes deep purple or black. The skin is stained by contact with it, and this property renders it a useful ingredient in the washes for dyeing the hair, and in the so called indelible inks, which however may be washed out by cyanide of potassium. The crystals obtained by evaporation when fused in a silver

crucible and run into cylindrical moulds form the sticks of lunar caustic used as an escharotic. Chloride of silver ( $\text{AgCl}$ ) is produced by introducing chlorine or a soluble chloride, as common salt, into the solution of nitrate of silver. It forms a dense white flocculent precipitate, which becomes black by exposure to the light. Boiling concentrated hydrochloric acid and strong chloride solutions dissolve it, and it is set free again by dilution. The salt is produced in the treatment of silver ores, and by a recent improvement, eliminated by recourse to this property, as will be noticed below. In water and diluted acids chloride of silver is quite insoluble, but in ammonia and a solution of cyanide of potassium it readily dissolves. Silver in solution is easily detected by the appearance of the chloride on adding a drop of nitrate of silver. The salt occurs as an ore of silver. Iodide of silver ( $\text{AgI}$ ) is produced when a soluble iodide is added to a solution of nitrate of silver. It is of a pale yellow color, and like the chloride is darkened by exposure to the light. The daguerreotype process is founded on this principle, the plate of silvered copper being exposed in a box to vapors of iodine, and then to the light reflected from the object to be represented. The bromide is of similar character to the iodide, and both, unlike the other salts of silver, are almost entirely insoluble in ammonia.—The combinations of silver with other metals to form useful alloys are very few. For plate and coin copper is added to the silver to increase the hardness in proportions varying in different countries. Steel may be made to retain about  $\frac{1}{10}$  of its weight of silver, which improves its quality; the alloy is known as silver steel. Combined with mercury, silver forms the most brilliant amalgam for mirrors.—Although ores of silver are comparatively rare, the metal itself is widely disseminated in small quantities among other ores, especially of lead, and is detected in minute traces even in sea water and in the ashes of various plants. It is always present with native gold, diminishing the value of this according to its proportion. This is one source of the silver of commerce; another is the argentiferous lead ores, in which small and variable proportions of sulphuret of silver exist in combination with the sulphuret of lead; and a third is the mines of native silver and of true silver ores. The last, commonly containing lead and copper, also pass into ores of these metals, as by diminishing quantities of silver its value becomes inferior to that of the others. Native silver is found in masses, and in arborescent and filiform shapes, in veins of quartz and calcareous spar traversing the metamorphic rocks and also the secondary sandstones and limestones. The masses are sometimes crystalline, and occasionally present distinct cubical and octahedral forms. The metal is sometimes almost chemically pure, as is that found with the native copper at Lake Superior; but it is usually more or less alloyed with other

metals. The most famous masses, several of which exceed 500 lbs. in weight, have been found at the mines of Kongsberg in Norway, of Freiberg, Schneeberg, and Johanngeorgenstadt in Saxony, at those of Bohemia and Hungary, and of Peru and Mexico. Though it has very rarely been found in comparative abundance in mines, it has in many instances by reason of its great value made up a considerable portion of the riches of their returns.—Silver glance, or vitreous silver, is the sulphuret of silver ( $\text{Ag}_2\text{S}$ ), consisting of silver 87.1 and sulphur 12.9, and the most valuable ore of the metal. It is of blackish lead-gray color, of metallic lustre and shining streak; hardness 2 to 2.5; specific gravity 7.196 to 7.865. It is easily out with a knife, and readily melts on charcoal before the blowpipe. It forms a considerable portion of the ores of the silver mines of the Erzgebirge and of Hungary, of Mexico and Peru, and is found in Cornwall. It has been found in some of the mineral veins on the islands on the N. coast of Lake Superior; but these are not now worked. Brittle sulphuret of silver, or stephanite, is another valuable ore found in the Austrian mines, in Zacatecas, Mexico, and in Peru. It is a double sulphuret of silver and antimony, when pure consisting of silver 70.4, antimony 14, and sulphur 15.6, but commonly contaminated with arsenic, iron, and copper. It has a metallic lustre, iron-gray color, and black powder; H. 2 to 2.5; sp. gr. 6.27. Dark red silver ore, or pyrargyrite, also known as ruby silver and black silver, contains nearly the same elements as the preceding ore, but in different proportions, as silver from 57 to 60, sulphur from 16.6 to 18, antimony from 21.8 to 24.6. Its color is black, sometimes approaching cochineal red, streak red; H. 2 to 2.5; sp. gr. 5.7 to 5.9. It is common in the Austrian and Mexican mines. Chloride of silver or horn silver ( $\text{AgCl}$ ) is a common ore in Chili, and is also obtained in Peru and Mexico; it has been met with in small quantities in many of the European mines. When pure its composition is, silver 75.3 and chlorine 24.7. It is of waxy appearance, resinous lustre, color pearl-gray, greenish, whitish, inclining to blue, and becoming brown in the air; H. 1 to 1.5; sp. gr. 5.3 to 5.5. In Chili and Peru it is of common occurrence in cubical crystals in the gozzan of ferruginous earthy matters that form the backs of the lodes, and are known by the names of *pacos* and *colorados*. The variety of native amalgam or argental mercury, known as *arquerite* from the mines of Arqueros in Coquimbo, Chili, is an ore of considerable importance in that region, and was long regarded as metallic silver. It was found, however, by Prof. Domeyko of Coquimbo, to contain 13.51 per cent. of mercury, and its composition is consequently represented by the formula  $\text{Ag}_2\text{Hg}$ . The more common variety of native amalgam, found in specimens in some European mines, contains silver 84.8, mercury 65.2, and is represented by  $\text{Ag}_2\text{Hg}_2$ . Argentiferous

galena is particularly noticed in the article LEAD. Galena is rarely deficient in a trace of silver, and this is profitably separated by the improved process of Pattison from lead holding 3 or 4 ounces of silver to the ton. The yield of silver ores is generally rated by the number of ounces troy they produce to the ton of 2,240 lbs. avoirdupois or 82,667 oz. troy. As 1 per cent. of silver (.01) would be equivalent to 827 oz. to the ton,  $\frac{3}{4}$  oz. is represented by the decimal 0.0001, or  $\frac{1}{1000}$  per cent. This is not much less than the average yield of the great mass of ores worked for silver even in Mexico and Peru; the great production is rather to be attributed to the immense quantities of such ores than to their superior yield. Beside the natural compounds of silver enumerated above, there are a variety of others, known rather as rare minerals than as workable ores, though occasionally some of them are met with in quantities sufficient to add materially to the production of the mines. Such are the combinations of iodine and bromine with silver, other alloys with arsenic, antimony, and other metals, and the carbonate of silver or selbrite.—The countries which produce the great supplies of silver in modern times are seen by reference to the table of the metals in the article MINES, vol. xi. p. 528. In 1854, for which year the estimates in the table were made, the total product was rated in value at \$47,443,200, of which Mexico furnished \$28,000,000; and next to this Peru, \$4,800,000; Chili, \$4,000,000; Bolivia, \$2,080,000; Spain, \$2,000,000; Austria, \$1,440,000; and Great Britain, \$1,120,000. The conquest of Mexico by Cortes in 1519–20 was soon followed by the development of the wonderfully rich silver mines of that country. The metal was known to the ancient Aztecs, and was worked by them with exquisite skill into numerous ornamental and useful articles; but among the vast mineral treasures of Montezuma the quantity of silver was small compared with that of gold, and gave little promise of the unbounded resources of the argentiferous mines of his territories. During the 16th century these were opened and extensively worked by the Spaniards in Guanajuato, Zacatecas, and other neighboring districts; and in the 17th and 18th centuries their production was greatly increased by reason of the greater abundance of quicksilver and its more general employment in separating the metal from its ores. At the time of the visit of Humboldt operations were carried on in from 4,000 to 5,000 localities, which might all be included in about 8,000 distinct mines. These were scattered along the range of the Cordilleras in 8 groups, the principal of which, known as the central group, contained the famous mining districts of Guanajuato, Oatorce, Zacatecas, and Sombrerete, and furnished more than half of all the silver produced in Mexico. The mines of Guanajuato, opened in 1558, are all upon the great vein, known as the *veta madre*, in the range of porphyritic hills the sum-

mits of which are from 9,000 to 9,500 feet above the level of the sea, but only about 3,000 feet above the high plateau of central Mexico upon which they stand. The great vein is contained chiefly in clay slate, and crosses the southern slope of the hills in a N. W. and S. E. direction, dipping with the slates (the range of which it follows) from  $45^{\circ}$  to  $48^{\circ}$  toward the S. W. It is of extraordinary thickness, often more than 150 feet across, and is said to have been traced for about 12 miles; but the productive portions are chiefly upon a length of about  $1\frac{1}{2}$  miles. The vein is made up of quartz, carbonate of lime, fragments of clay slate, together with large quantities of iron pyrites, and sulphurets of lead and zinc with some native silver, sulphuret of silver, and red silver. Near the surface they are partially decomposed and colored red, whence they are termed *colorados*. In their unchanged condition below they are designated *negros* or black ores. These are the main dependence of the mines. The vein has been penetrated to the depth of about 2,000 feet, but not much below the level of the plateau. The mine of Valenciana, upon a rich portion of the vein, has averaged for years together a product of £320,000, or about  $\frac{1}{7}$  of the total product of the 8,000 mines of Mexico, and  $\frac{1}{4}$  of that of the whole of the *veta madre*. The mines of Zacatecas, opened in 1548, are also upon a single vein called the *veta grande*, averaging in thickness about 30 feet. The formation is of greenstone and clay slate, the former the most productive. The veins of Catorce are in limestone, supposed to be of carboniferous age. The greatest proportion of silver in every mining district of Mexico is obtained from the sulphuret of silver, an ore of gray color disseminated through the quartz matrix in minute particles, and more or less combined with other metals. The other varieties of argentiferous ores are numerous, but comparatively small in quantity; they are the chloride of silver, ruby silver, native silver, argentiferous pyrites, and argentiferous galena. The comparative quantities of these at the different mines is very variable. Until the present century the ores have been extracted altogether by the rude methods of the native Indians. They brought them upon their backs up the long flights of thousands of roughly formed steps in loads of 240 to 380 lbs. each, while exposed all the time to the great heat of the mine, reaching from  $70^{\circ}$  to  $80^{\circ}$  F. In 1821 the Mexican government offered facilities for foreigners to become interested with the natives in the mines. A number of English mining companies were formed, and operations were undertaken upon a new system with the object of working the mines with powerful machinery, and with all the advantages of English experience, skill, and capital. The adventures were almost universally unsuccessful, the capital being wasted over extensive areas instead of being concentrated at a few points, and the nature of the country being extremely unfavorable for the

introduction of heavy machinery, as well as for keeping it in operation and repair. The English also generally sought to continue the old deep mines that had been abandoned, rather than commence new explorations; and the result of experience in working the silver mines is unfavorable to the search for rich ores after they have failed to be profitable at the depth of from 250 to 350 fathoms. From the opening of the Mexican mines in the 16th century their production of silver has exceeded that of all other countries. A great stimulus was given to it by the amalgamating process devised by Medina at that early period in Mexico, and it soon attained an annual rate of from \$2,000,000 to \$3,000,000. This continued to increase till in the 18th century it rose to \$23,000,000, and such was about the production for the first 10 years of the present century, after which it was greatly checked by the war of independence. Since 1850 it has increased till it has of late exceeded the yield of all past periods. It is even asserted, not however on official authority, that the yield in 1856 had reached full \$40,000,000. The total product, from the first working of the mines by the Spaniards to their expulsion by the Mexicans in 1827, is stated from the records of the mints to have been \$2,028,000,000. The silver mines of northern Mexico, near the boundary of the United States, are supposed to be of great value also, but their development has been retarded by the hostility of the Apache and Comanche Indians, who hold possession of portions of these territories. Mining operations have however been undertaken of late upon the Rio Grande, and also over the American line in Arizona territory, the products of which are already reaching the United States. Central America possesses no silver mines that are worked to much extent; but rich ores are known to exist in Honduras, Nicaragua, and Costa Rica. —The famous mines of Potosi in Peru (now Bolivia) were discovered in 1545 by an Indian hunter, Diego Hualca, who, according to Acosta, accidentally exposed native lumps of the precious metal in the roots of a bush which he pulled from the ground. This led to the discovery of extraordinary quantities of native silver, and the city of Potosi soon sprung up in the barren and almost inaccessible district. For 20 years succeeding 1557 the annual production of the mines of this region was about \$2,200,000, and the total product up to the present time is rated at over \$1,300,000,000. (See *ANDES, PERU, and POTOSI*.) Silver mines are worked in various parts of Peru, many of them upon a small scale and secretly for the purpose of avoiding the government dues. In the Cerro de Fernando at Hualgayoc, near Micuipampa, rich ores were discovered in 1771, and there are now, it is said, about 1,400 pits opened in the hill. Other important mining districts are Gualanca in Huamalia, Pasco, Lucanas, and Huantajaya. Cerro de Pasco is especially famous for its large production. A

town is built upon the site of the mines, and the openings to many of them are through the houses of the miners. In Bolivia, beside the mines of Potosi, are those of Portugalete in the province of Chichas, celebrated for the richness of their ores, which produce 6 to 8 times as much silver to the *caxon* as those of Potosi. Other mines also are worked in the same district. The mines of Lipes have been very productive, and those also of La Plata, Porco, Carangas, and Oruro. The earlier silver mines worked in Chili were in the province of Santiago and in the mineral district of Arqueros, about 17 leagues from Coquimbo. The production was not large, and has almost ceased since the opening of the rich mines near Copiapo in the province of Atacama. Within a circuit of 25 leagues from this city there are 19 silver mining districts, of which those of Chañarcillo and Tres Puntas are the most important. The metal is found in a variety of combinations, as a sulphuret, chloride, chloro-bromide, and iodide; it is also associated with arsenic, antimony, and mercury, and is sometimes abundant in a native state. The ores of difficult reduction have been largely transported to England to be there treated, the exports in 1852 exceeding 5,000 tons; but works have since been constructed by the English smelters at Caldera, the port of Copiapo, for their reduction. The mines are in a country difficult of access, quite unproductive even in the timber and fuel required for mining purposes, almost entirely destitute of water, and of a cold and dreary climate.—Of the silver mines of Spain, none have been esteemed of importance from the middle ages down to the year 1825, except the mines of Guadalcanal and Oazalla to the N. of Seville. In the 16th century they were profitably worked by the government, and produced altogether 400,223 marcs of silver. They afterward passed into private hands, and in the beginning of the 17th century are said to have produced daily about 170 marcs of silver. They were finally abandoned and the workings filled with water. In 1825 mining operations were revived in Spain; in 1839 the famous silver mines of the Sierra Almagrera in the province of Almeria were discovered, and in 1843 those of Hiendelencina in the province of Guadalajara. In 1850 the Almagrera mines produced 40,596 marcs of silver, which however is a falling off of their earlier yield. The veins run nearly N. and S. in finely grained clay slates and micaceous slates, and contain chiefly argentiferous galena with some chloride of silver. The great lode of the Jaroso mine is from 18 to 24 feet thick. The veins of Hiendelencina run E. and W., and are seldom more than 3 feet thick; they produce sulphurets and chlorides of silver unmixed with lead. By the application of Pattison's process of desilvering lead (see LEAD, vol. x. p. 387) to the product of the argentiferous galenas of the numerous lead mines of Spain, especially in the provinces of Murcia and Almeria, a great increase has

been made in the production of silver in that country. Such ores are the source of the silver obtained in Great Britain; but until the invention of Pattison's process only those richest in silver could be treated for this metal. It is estimated that at the present time from 5 to 8 oz. of silver to the ton are obtained from more than 80,000 tons of lead, making an aggregate of not less than 200,000 ounces of silver annually, which but for this process must have remained with the lead. The total production of silver in Great Britain for the years named was as follows:

Localities.	1854.	1857.	1858.
England: Counties.	oz.	oz.	oz.
Cornwall.....	248,496	224,277	228,189
Devon.....	77,456	50,262	58,866
Cumberland.....	51,981	43,460	43,721
Durham and Northum- berland.....	79,924	74,091	78,238
Westmoreland.....	23,860	24,808	22,503
Derbyshire.....	....	....	8,000
York.....	802	445	1,057
Somersetshire.....	....	....	1,295
Total.....	481,909	417,848	426,974
Wales.....	62,857	60,097	71,598
Isle of Man.....	60,882	48,016	46,955
Scotland.....	5,282	4,206	4,852
Ireland.....	8,700	8,071	14,861
Sundries.....	550	183	800
Silver from silver ore.....	....	....	4,250
Total.....	614,180	589,866	569,245
Value.....	£158,470	£138,216	£156,569

The mines of Schemnitz and Kremnitz in N. W. Hungary were worked by the Romans, and after being abandoned were reopened in the 7th or 8th century. These and various mines in Bohemia and other parts of Austria were productive during the middle ages, and are still profitably worked. The ores are for the most part argentiferous galenas, yielding from 20 to 200 ounces to a ton of lead. The most celebrated mines are those of Joachimsthal in the Bohemian circle of Saatz, those of Altenberg in Styria, and Schellgadin in Salzburg. The last named were reopened in 1878, and are now the most productive. The mines in the Tyrol near Brixen were known in the 16th century as the El Dorado, and in 1528 produced 8,800 lbs. of silver; but they have long since been abandoned. The mining district of Freiberg in Saxony was a wild, valueless region previous to the 10th century. The shining argentiferous lead ores were discovered in the tracks made by the wheels of the wagoners, and in 1169 the veins were first discovered and opened. From that time they have been worked in great numbers, and have added not a little to the silver product of Europe. The yield of the ores in silver is in general greater than that of the ores of Mexico and Peru, but the veins are comparatively small. In 1750 a mass of native silver was obtained near Freiberg weighing 168 lbs. The mines of Schneeberg in Saxony were especially famous for their large production of rich silver ores in the 15th century. In Norway silver mines are worked at Kongsberg, 52 miles from

Christiania, the capital. They were discovered in 1624, and were immediately taken possession of by the crown. The highest yield of any year was in 1833, amounting to 29,390 lbs. troy. Fine specimens of native silver are obtained from these mines. In the royal museum at Copenhagen are two specimens, one 6 feet long, 2 feet broad, and 8 inches thick, nearly all of which is silver; the other, which is pure, is about 18 inches long and 12 inches square. A number of silver mines were formerly worked in Sweden; but at present the only one of importance is the Sala or Salaberg in Westmannia, 23 leagues N. W. from Stockholm. It yields rich argentiferous galena, and the annual product is from 4,000 to 5,000 marcs of silver. Numerous silver mines are found in the Ural and Altai mountains, especially in the district of Kolyvan. The metal is also produced in Thibet, China, Cochinchina, Japan, and other Asiatic countries.—The United States had hardly been known as a silver-producing country until the discovery of the California gold mines, when the small proportion of silver which accompanies the gold began to attain considerable importance in the great production of that metal. In North Carolina the Washington mine in Davidson co. has been known as a silver mine since the year 1840, sometimes affording ores of great richness, but very fluctuating in quantity; and the lead ores of Phoenixville, Penn. (see LEAD), have at times furnished some silver also to the U. S. mint. With the Lake Superior copper have also been found small quantities of native silver, and this is now collected in such amount as to be regularly received at the mint; while the recently discovered mines of Washoe on the borders of California and Nevada territory, and those of Arizona, add still larger and rapidly increasing quantities to the total amount. From the returns of the U. S. mint at Philadelphia the receipts of American silver for the year ending June 1, 1861, amounted to \$600,000, derived as follows: from the Washoe region, \$300,000; from Lake Superior, \$13,000; from Arizona, \$12,000; from North Carolina, \$6,000; and from the gold of California and Colorado, \$369,000. The Washoe mines are situated along a range of hills lying just below the Sierra Nevada on its E. side. The region has for some time been known as producing gold, the value of which was deteriorated by its large percentage of silver. Toward the close of 1859 the discovery was made of veins of argentiferous galena, some of which contained very large proportions of silver. Great excitement was produced throughout California by this discovery, and during the year 1860 a large emigration set in to the wild territory, and a considerable number of mines were opened upon veins of a permanent character. The district is about 160 m. N. E. from Sacramento, on the other side of the Sierra Nevada, in the valley of the upper portion of Carson's river; its outlet is in this direction to San Francisco.

The silicious and otherwise complex character of the ores renders them very difficult to reduce, and through want of proper metallurgical works and skill in the country they have been transported to the Pacific coast, and shipped to New York, and thence to England. As many of them contain silver to the amount of \$2,000 per ton, the cost of transportation is not a large item in comparison with their value. The amount of silver reported above as received from these mines is but a very small portion of their actual product. The Arizona mines are near the Gila river, in a silver mining district formerly occupied and worked by the Mexicans, from which they were driven by the Indians. Since the country came into the possession of the United States, a number of the old mines have been reopened by companies formed in Cincinnati, New York, and St. Louis. Guaymas, the chief port of the gulf of California, is the outlet of the district, the mines being from 270 to 420 m. N. of it in a region to the N. and S. of Tucson. The mines of the Sonora company of Cincinnati, about 75 m. S. of Tucson, were opened in 1858, and have produced a considerable amount of silver, which is separated at the smelting works of the company at Arivaca, 7 m. from the mines. The Maricopa company of New York commenced operations 70 m. N. of Tucson in 1860, upon veins of vitreous copper ores that contain variable quantities of silver, worth from \$40 to \$80 per ton. Other mines also are in operation in the same region, and it is probable that this will eventually become of considerable importance for its production of silver; but at present it suffers serious drawbacks in the thinness of population, the aridness of the climate and consequent want of fertility of the soil, its remoteness from the coast, and its liability to the incursions of hostile Indians.—*Metallurgic Treatment.* The methods of separating silver from its ores are based either upon forming an amalgam of the metal with mercury, and thus running it out in a fluid state, as in the treatment of gold ores, or on bringing it into combination with lead by fusion, and afterward separating the two metals by cupellation. As the silver, however, unlike gold, is not for the most part already in the metallic state, the amalgamating process is made more complicated by the primary operations required to break up its chemical combinations. The ores of Mexico and Peru are treated by both processes; but only about an eighth of the silver of Mexico is obtained by smelting. The rich ores are picked out from the heaps as the products of the mine are broken up with hammers, and are reserved for the furnaces; but the great mass of the ores are destined for the amalgamation heaps. The furnaces are small blast furnaces such as are in use in Germany, with charcoal for fuel, and the charges consist of the crushed ores mixed with slags and residues of former smeltings, together with litharge or oxide of lead and a little iron ore and lime. The pro-



ness is an expensive one, amounting to £15 to £20 per ton, except in a district like Timapan, where lead ore is abundant. Some of the establishments for reducing the ores are of great extent and very complete in their arrangements; they are called *haciendas de beneficio* or *haciendas de plata*. The Hacienda de Regla at Real del Monte contains both smelting and amalgamating works; that in Fresnillo, 85 m. from Zacatecas, is the largest for amalgamating only, covering a space within walls of 1,370 by 1,120 feet. The amalgamation process was invented in Mexico in 1557 by Bartolomé de Medina. Though a rude method, it is perhaps the best for these regions, where the ores are abundant and poor, labor cheap, fuel scarce, and mechanical operations must necessarily be of the rudest character, with little aid from water or steam power. The ores brought up from the mines having been assorted, and the best selected for smelting, the rest, in which the silver even when in the native state is almost universally in too small quantity to be visible, is crushed by rude stamping machines, and is then ground with water to fine slime or mud in the machines called *arrastres*, numbers of which are usually arranged under a covered shed, and each worked by two mules. (See *ARRASTRE*.) The finer the grinding the more readily is the silver afterward separated, and the less the loss of mercury in the subsequent operations. The fine paste is turned into pits and left for some days to dry to suitable consistence. It is then spread out in circular heaps of 30 to 50 feet diameter, and nearly a foot deep, upon the extensive floors, which are sometimes laid with boards and calked, and sometimes are paved with flat stones. To each heap of about 60 tons is added in the centre about 150 bushels of impure salt, and this is then well intermixed, first by shovels and then by treading of horses or mules. The next day the treading is repeated for an hour, when from  $\frac{1}{4}$  to 1 per cent. of calcined and pulverized pyritous copper, called *magistral*, is added and thoroughly incorporated into the mass by treading. The *magistral* contains from 8 to 10 per cent. of sulphate of copper, and as much sulphate of iron, which are the active ingredients in the chemical reactions that take place. The smaller quantity is required in cold weather, the larger quantity in summer, and with richer ores, as, very singularly, in winter the heaps become hotter than in the summer. If the heat grows too great it is checked by introducing lime. The mercury is next added by filtering it through a canvas bag all over the heap, and this too is incorporated by shovels and by treading. It is turned over and trodden anew every other day, and more mercury is added each time till the heap has received the established quantity. This is ascertained by occasional tests which the superintendent or *azoguero* makes by panning as in gold washing, judging from the appearance of the amalgam and the quicksilver whether any more of

the latter is required. In Zacatecas, for ores yielding from 30 to 35 ounces to the ton, the total amount of mercury employed upon each heap of 60 tons is 1,620 lbs. In summer from 12 to 15 days are required for the completion of the process, and in winter from 20 to 25; but in other parts of Mexico it sometimes occupies from 6 weeks to 2 months. The amalgam is recovered by a system of washing similar to that practised in collecting gold. The prepared materials are introduced into circular vats built in masonry, each about 8 feet deep and 9 in diameter. A vertical central shaft carrying horizontal arms is made to rotate in each one, stirring up the contents, while a stream of water circulates through, carrying over the top the lighter muddy portions. The operation is also performed by men treading the slimes in a current of water. The amalgam collects in the bottom, and from time to time is allowed to flow out into another smaller apparatus of similar construction, where it is further worked. It is at last collected in a leather bag with a canvas bottom, and being well squeezed the free mercury passes through, carrying a little silver with it, while the mass remains in a semi-solid state in the bag. The mercury is used for the next operation, and the amalgam is moulded into wedge-shaped blocks, each of about 30 lbs. weight, which are piled upon each other on an iron plate in the building called the burning house. When sufficient heaps are collected, they are covered with a great iron bell, which is let down over them from the roof and carefully luted round the edge. An iron pipe passes down through the centre of the plate into a cistern of water beneath. A fire of charcoal is kept burning during a night close around the bell, and the heat of this drives off the mercury in vapor down the pipe and into the water, where it is condensed and finally recovered. The silver is found in solid masses when the bell is raised up. It is weighed, and then usually cast into ingots or bars of 80 or 90 lbs. each. The process is a wasteful one for mercury, every 100 lbs. of silver, it is stated, involving a loss of from 180 to 150 lbs. of mercury. This occurs in the amalgamating heaps from the conversion of portions of the mercury into the protochloride or calomel, which is afterward washed away with the earthy matters. It has been estimated that the total expenditure of mercury in this process during the 17th and 18th centuries amounted to 6,000,000 cwt. The chemical changes that take place are somewhat complicated, but are commonly explained as follows: The sulphate of copper of the *magistral* and the common salt mutually decompose each other, becoming chloride of copper and sulphate of soda. The metallic silver present converts the chloride of copper into the subchloride, combining itself with the chlorine liberated. The dichloride of copper in contact with sulphuret of silver is dissolved in the solution of common salt, and is then converted

into sulphuret, while the silver becomes a chloride. The mercury then reacts upon the silver salt, giving rise to the formation of the silver amalgam and the protochloride of mercury or calomel. An excess of magistral produces an excess of chloride of copper, the effect of which is to divide the mercury into very minute globules. When this is observed, lime is added to decompose the excess of chloride of copper, which otherwise would reconvert the silver into chloride and the mercury into calomel. The *rationale* of the process is differently given by some authorities. The amalgamating process is carried on upon a large scale at Freiberg in Saxony, upon a plan differing from the American chiefly in the substitution of mechanical moving power and fuel for manual labor. The different character of the ores, however, involves some modifications of the American method. They contain a great variety of other metals beside silver, as lead, copper, antimony, arsenic, iron, zinc, and sometimes bismuth, gold, nickel, and cobalt. The presence of lead to the extent of more than 7 per cent. is detrimental to the amalgamating process, and of copper of more than 1 per cent. It is necessary therefore to guard against this excess, and the ores rejected in assorting the heaps are treated by another method. The proportion of silver required is about 80 oz. to the ton, and of iron pyrites, to furnish sulphur, about one third of the whole mass. The object of the sulphur is to decompose the chloride of sodium, which is afterward added, and thus generate chlorine. The mass is reduced to powder by stamping, and is then mixed and thoroughly incorporated with  $\frac{1}{10}$  its weight of common salt. The mixture is roasted in a calcining furnace, first at a low red heat and with constant stirring. Fumes of arsenic and oxide of antimony appear as the heat is raised, and these carrying over with them some silver condense and are collected in the receiving chambers above the furnace. The iron pyrites and other sulphurets are next decomposed, the sulphur burning with a bluish flame and giving off vapors of sulphurous acid. These finally cease, and, the heat being raised to full redness, are succeeded by vapors of chlorine and of chloride of iron. By the chlorine thus produced about 85 per cent. of the silver is converted into a chloride. From 4 to 6 hours are spent in roasting each charge of  $8\frac{1}{2}$  to  $4\frac{1}{2}$  cwt. The roasted materials taken from the furnace are next screened, and the coarser portions are broken up and again roasted for two hours with 2 per cent. of common salt. The finer are ground in a mill and bolted till reduced to impalpable powder. This is introduced in charges of half a ton each into revolving horizontal casks, together with about 83 gallons of water to each cask and from 78 to 100 lbs. of scrap iron. After revolving slowly for an hour or two the casks are stopped and examined. More water or ore, as may be required, is added, and also 5 cwt. of mercury. The rotation is then renewed and kept up for

18 hours at the rate of 20 to 25 turns a minute. The casks are occasionally examined to insure a right consistency in the charges. The effect of the metallic iron first added is to reduce the sesquichloride of iron in the mixture to protochloride, with the view of guarding against the conversion of the mercury into protochloride. The excess of iron afterward aids in decomposing the chloride of silver, the dichloride and the sulphate of copper, and thus facilitates the production of the amalgam of silver and copper. The amalgamation being completed, the casks are filled entirely with water and made to revolve 2 hours longer at a slow rate. This collects the amalgam together, so that it can be run off through an opening in the lower side of the casks, and to it is afterward added that obtained in washing up the other contents of the casks. The amalgam is squeezed through a bag, the excess of mercury is returned to the next operation, and the solid amalgam is kept for distillation. It consists of about 84 per cent. of mercury, 11 of silver,  $3\frac{1}{2}$  of copper, and 1 of antimony, lead, zinc, &c. It is collected in quantities of 8 to 5 cwt. and placed in iron trays arranged one above another upon a tripod of iron bars, which stands in a trough of water. A tall bell is let down over this and a fire is made around its upper portion. The mercury volatilized by the heat leaves the metals and settles down in the water, where it is afterward recovered. The spongy metallic residuum is then fused in crucibles and run into ingots, to be purified by subsequent operations. The fumes formed in the calcining process are occasionally collected and ground up together with the crucibles employed in refining the silver, and the product is carried to the amalgamation casks. The unavoidable loss of silver not separated from the ores by this process is found to be from 5 to 9 per cent. of that they contained; and the loss of mercury is only about  $\frac{1}{4}$  part of the silver obtained, the great saving in this over the results of the American process being due to the reduction of the chloride of silver by the iron and not by the mercury.—Some important improvements have recently been introduced in Europe in treating silver ores, by which the use of mercury is entirely dispensed with. By one method, after the ore has been first roasted by itself, and then with common salt, it is digested in a concentrated solution of the same salt. This dissolves the chloride of silver, and when diluted lets down that which it had taken up. But instead of thus separating the chloride, it is found better to digest the solution upon metallic copper, which causes precipitation of the metallic silver with formation of chloride of copper. The presence of this salt in solution does not interfere with the use of the liquid upon fresh portions of ore. Another process is conducted without converting the silver into a chloride. The powdered sulphurous ores are roasted to the complete decomposition of the sulphates of iron and copper, while

the sulphate of silver, which is unaffected by the high temperature, remains in the mass. It is then dissolved out by boiling water and precipitated by metallic copper. Both processes have been extensively practised in England.—The treatment of the various argentiferous lead and copper ores, from which the silver is to be separated, differs in different countries, and is varied according to the peculiar characters of the ores. The lead or the copper is first obtained, carrying with them the silver, which is afterward separated by cupellation, liquation, or otherwise. Some argentiferous galenas having a low produce of lead and a silicious gangue, such perhaps as the Washoe silver ores, are reduced at Clausthal in the Hartz by a special method designed to avoid the formation of oxide of lead in the smelting furnace, which combining with the silica present produces a vitreous slag extremely difficult of reduction. A mixture is consequently made of the crushed ore with various secondary products obtained at different stages of the process, together with a quantity of granulated cast iron; and the fusion is conducted in a small blast furnace 20 to 25 feet high and about 3 feet in diameter at the widest part, with the admission of no more air than is necessary to keep up the fire. The process as described by Regnault is given in Phillips's "Manual of Metallurgy," p. 510.—Another new method of desilverizing argentiferous lead, beside that of Pattison, has recently been introduced in some of the English metallurgical works, where it is known as Parke's process. It is based on the property possessed by metallic zinc of taking up the silver from the melted metal, and forming with it a scum which floats upon the surface of the metallic bath. The lead treated by this process commonly contains 10 to 15 oz. of silver per ton. It is melted to the amount of 6 or 7 tons in a large cast iron pot, and some zinc is melted in another pot attached to it. The lead being assayed, zinc is added in the proportion of from  $1\frac{1}{2}$  to 2 lbs. to each ounce of silver, and the alloy is well stirred for an hour to two hours. The fire is then allowed to go down, and the metal is left for the scum to rise. As it forms it is taken out, strained with a perforated ladle as in Pattison's process, and removed to a sloping iron retort, which is heated to melt the lead taken up with the scum. As this fuses it flows down into a mould, carrying with it silver to the amount of about 1,000 oz. to the ton. This is immediately cupelled. From the residues found in the retort the zinc is expelled by distillation, and about half the whole employed is thus recovered, and more silver remains behind, together with any lead, copper, nickel, &c., that may have been present. The lead in the cast iron pot, after the removal of the crust, is ladled out into a gutter, which conducts it into a reverberatory furnace with a cast iron bottom, where it is kept for some hours at a low red heat in order to drive off the last traces of zinc. It is then let into an

iron pot and boiled with green wood, as in the purifying of copper and tin. The lead is said to be thus obtained very pure, and with a loss of about one per cent.—Copper ores containing silver are commonly reduced by some of the methods of treating copper ores to the condition of "black copper," and this when it contains as much as .003 of silver is submitted to the process of liquation or sweating. It is melted with 3 to 4 times its weight of lead, at least 480 times that of the silver, and the alloy is cast into cakes or disks. These are then subjected to a carefully regulated heat, not sufficient to melt the copper, and the lead gradually sweats out, bringing with it nearly all the silver and a little copper. A spongy residue of copper remains behind, containing a little lead. This is oxidized by roasting, and the copper is then refined.—The principal uses of silver have already been mentioned in the course of this article; see also COINS, ELECTRO-METALLURGY, MINT, PLATE, and PLATED MANUFACTURE. The silvering of metallic articles is sometimes cheaply performed by decomposing the chloride of silver upon their surface. For this purpose 1 part of the pulverized chloride is mixed with 3 parts of pure pearlash, 1 of washed whiting, and  $1\frac{1}{4}$  of common salt. The metallic surface, being thoroughly cleaned, is rubbed with soft leather or cork moistened with water, and dipped into the composition. It must then be thoroughly washed with water, dried, and immediately varnished. Another method, after the article has been cleansed by dipping it for a moment in nitric acid in order to remove the film of oxide, which always forms from exposure to the atmosphere, is to rub over the surface a mixture of 100 parts of cream of tartar, 10 of chloride of silver, and 1 of corrosive sublimate. Metallic silver powder precipitated by copper is also used in a similar way, mixed with two parts of cream of tartar and as much common salt. The surface is then washed in tepid water having an alkaline reaction, then in pure water slightly warm, and is finally wiped and dried. "Dry silvering" is the application of silver amalgam to the surface and expelling the mercury by heat. Brass buttons are silvered with a composition of 2 oz. chloride of silver, 1 oz. corrosive sublimate, 3 lbs. common salt, and 3 lbs. sulphate of zinc, made into a paste with water. The buttons, being well cleaned, are smeared over with this, and exposed to a moderate heat, which is finally raised to redness. For silver plate and coins, the greatest hardness is obtained with  $\frac{1}{2}$  of copper. (See ALLOY, and COINS.) The coloring effect of the baser metal is often removed from the surface by the process called "whitening." The article is heated nearly to redness in order to oxidize the copper upon the outside in contact with the air, and it is then plunged while still hot into water acidulated with nitric or sulphuric acid. This removes the oxide of copper, and leaves the particles of pure silver of a blanché or dead white appearance, which

if desired is removed by burnishing. The blanching appearance of new coin is owing to this treatment applied to the blanks before milling. Articles of plate are also deadened or melted by boiling them in bisulphate of potash.

**SILVERSIDE**, or **SILVER FISH**, the common name of the small marine spiny-rayed fishes of the family *atherinidae*, characterized by a protractile mouth, without notch in upper jaw or tubercle in lower, small crowded teeth on the pharyngeals, the 1st branchial arch with long pectinations, 2 dorsals most commonly distant, and ventrals behind pectorals; the eyes are very large. In the genus *atherina* (Linn.) the body is elongated, and a broad silvery band runs along each side. The dotted silverside (*A. notata*, Mitch.) is from 3 to 5 inches long, greenish brown with black points on the edges of the scales, and the fins translucent; the dorsals are contiguous, the 2d reaching as far back as the anal; it is found from New England to South Carolina. It accompanies the smelt in spring and autumn into our rivers, and is popularly called capelin, though this name properly belongs to the *mallotus villosus*. Several other species, about 4 inches long, are found in the waters of the southern states and West Indies. The *A. Humboldtiana* (Cuv.), from Mexico, attains a length of 11 inches; it is perch-like in form, with a more pointed snout; color greenish with silvery reflections, and the caudal edged with blackish. Another Mexican species (*A. vomerina*, Cuv.) is 8 inches long. More than 20 other species are described by Cuvier and Valenciennes in vol. x. of the *Histoire naturelle des poissons* (1835); they are much valued as articles of food; they swim in shoals, and are easily taken in nets; the roe and young fry are highly esteemed along the shores of the Mediterranean; the flesh resembles that of the smelt, whence the *A. presbyter* (Cuv.) is often called sand smelt; many species, salted, are sold as sardines, and some are called anchovy, a name properly belonging to the genus *engraulis* (Cuv.) of the herring family.

**SIMBIRSK**, an E. government of European Russia, bounded N. by Kasan, E. by Orenburg, S. by Samara and Saratov, and W. by Penza and Nijni Novgorod; area, 18,763 sq. m.; pop. in 1858, 1,140,978. The surface consists generally of a plain, which rises into hills of about 400 feet in height toward the E. The government is intersected in the E. by the Volga, and in the W. by its tributary the Sura. Gypsum, alabaster, limestone, sulphur, and naphtha are found. The soil is fertile and well cultivated. There are some manufactures of leather, cloth, tallow, potash, and glass. The inhabitants belong chiefly to the Greek church, but there are a few Christians of other sects, and some 70,000 or 80,000 Mohammedans and people professing other oriental creeds.—**SIMBIRSK**, the capital, is situated on the right bank of the Volga, 105 m. S. S. W. from Kasan, and 448 m. E. S. E. from Moscow; pop. about 18,000. It stands in a commanding position in

the midst of a wide and fertile plain, and contains manufactories of soap and candles, 16 churches, and a monument to the historian Karamsin, who was a native of the province.

**SIMEON**, the 2d son of Jacob and Leah. He and his brother Levi were guilty of gross deception and ferocity in their murder of the Shechemites (Gen. xxxiv.), for which they received their father's curse (Gen. xlix. 5-7); and it has been inferred from Joseph's selecting Simeon as a hostage (Gen. xlii. 24), that he had been particularly active in promoting the sale of Joseph to the Ishmaelites. The curse of Jacob: "I will divide them in Jacob, and scatter them in Israel," was fulfilled in regard to both Simeon and Levi. (See **LEVI**.) Simeon's inheritance as a tribe was not a compact territory, but a small district within the limits of that of Judah, and some tracts in Mount Seir and the district of Gedor. (1 Chron. iv. 24, 39, 42.) The descendants of Simeon amounted at the exodus to 59,800; but only 22,200 entered the promised land.

**SIMEON, CHARLES**, an English divine, born in Reading in 1759, died Nov. 13, 1836. He was educated at Eton and at King's college, Cambridge, and having taken orders was presented in 1788 to the living of Trinity church, Cambridge, which he held till his death, a period of 53 years. He was eminently distinguished for his unostentatious piety, and for the assiduity with which during his long ministry he discharged the duties of a parish priest. His works, filling 21 volumes, were published in 1832, comprising upward of 2,000 skeleton sermons; and his life has been written by the Rev. W. Carus (1847).

**SIMEON STYLITES**. See **STYLITES**.

**SIMFEROPOL**, or **SIMPHEROPOL** (Turk. *Ak-medshid*), a town of European Russia, capital of the government of Taurida, in the Crimea, situated on the Salghir, 192 m. S. E. from Odessa, and 40 m. N. E. from Sebastopol; pop. 8,000. It stands on a plateau at the foot of lofty hills, and consists of two parts, the old and new town. The former was built by the Tartars, is very irregularly laid out, and has a miserable appearance; the latter was built by the Russians, and has wide straight streets and a spacious square. The Greek cathedral is considered one of the finest churches in Russia. The population is made up of Russians, Tartars, Greeks, Armenians, and Germans.

**SIMMS, WILLIAM GILMORE**, an American author, born in Charleston, S. C., April 17, 1806. He is of Irish extraction on the father's side. At 7 years of age he began to write verses, and during the war of 1812 his chief employment in his leisure hours was to compose rhymed narratives of the exploits of the American army and navy. Owing to the straitened circumstances of his family and a sickly childhood, his early education was very simple, and at 10 years of age almost his only acquirements were a knowledge of reading and writing. At that period his father, who had some years

previous sought to better his fortunes by migrating to the south-west, made preparations for removing young Simms, who was his only surviving child, to his plantation in Mississippi territory. His grandmother, in whose care he had hitherto been, resisted his removal from her care, and an exciting lawsuit ensued, resulting in his retention, in accordance with his own wishes, in Charleston. For several years he was employed as clerk in a drug and chemical house in Charleston, but at 18 he quitted this occupation to commence the study of law. At 20 he was married, and on his 22d birthday was admitted to the bar. A year's practice sufficed to weary him with his profession, and in 1828 he became editor and part proprietor of the "Charleston City Gazette." He had previously published a "Monody on the Death of Charles Cotesworth Pinckney" (1825), and 2 volumes entitled "Lyrical and other Poems" and "Early Lays" (1827). These were succeeded in 1829 by "The Vision of Cortes, Cain, and other Poems," and in the following year by "The Tricolor, or Three Days of Blood in Paris," a metrical celebration of the French revolution of July, 1830. The "Gazette" having during the period of the nullification excitement declared itself in favor of the Union, involved its proprietors in heavy pecuniary losses, and in 1832 Mr. Simms found himself nearly penniless. Having about the same time lost by death his grandmother, father, and wife, he left Charleston for the North. At Hingham, Mass., where he passed the summer, he prepared for the press the longest and best of his imaginative poems, "Atalantis, a Story of the Sea" (New York, 1833), which was the means of introducing the author to the literary circles of New York. In the same year appeared his first prose tale, "Martin Faber, the Story of a Criminal," expanded from a magazine article published 10 years previous; and thenceforward down to the present time Mr. Simms has been one of the most industrious and prolific of living authors, sending forth in rapid succession volumes of poetry, romance, history, biography, or miscellaneous literature, many of which have obtained a wide popularity. His poetical works, in addition to those already mentioned, comprise "Southern Passages and Pictures" (1839); "Donna Anna" (1843); "Grouped Thoughts and Scattered Fancies" (1845); "Lays of the Palmetto" (1848), a series of ballads illustrating the deeds of South Carolina soldiers in the Mexican war; "Poems, Descriptive, Dramatic, Legendary, and Contemplative" (2 vols., 1854); "Areytos, or Songs and Ballads of the South" (1860); and a number of occasional pieces. He has also produced two dramas, "Norman Maurice, or the Man of the People," and "Michael Bonham, or the Fall of Alamo," and has adapted Shakespeare's "Timon of Athens" for the stage, with numerous additions of his own. As a writer of prose romances, however, he is altogether better known than by any other productions of his

pen, and no American author has drawn more frequently from local or revolutionary history to give interest to his narratives. His novels may be divided into four classes, those of a purely imaginative character, those founded on general history, the series of revolutionary stories, and the romances of backwoods life, designated as border tales. His contributions to imaginative fiction comprise a *mélange* entitled "The Book of my Lady" (1833); "Carl Werner" (1838); "Confession, or the Blind Heart" (1842); "Castle Dismal" (1845); and two series of tales entitled "The Wigwam and the Cabin" (1845-'6) and "Marie de Berniere" (1858). His historical romances are: "The Yemassee" (1835), one of the author's most carefully written and successful works, founded in great measure upon his experience of the Indian character; "Pelayo" (1838), and its sequel "Count Julian" (1845); "The Damsel of Darien" (1845); "The Lily and the Totem, or the Huguenots in Florida;" "The Maroon and other Tales" (1855); "Vasconcelos" (1857); and the "Cassique of Kiawah" (1860). The "Partisan" (1835), the first of his revolutionary stories, was followed in the succeeding year by "Mellichampe," and after a long interval by "Katharine Walton" (1851), both in continuation of the original story; and the 3 works constitute an epitome of the history of active military operations in the Carolinas during the revolution, with graphic pictures of scenery and manners. His remaining works of this class are: "The Scout," originally published as "The Kinsmen, or the Black Riders of the Congaree" (1841); "Woodcraft," originally entitled "The Sword and the Distaff;" "The Forayers, a Raid of the Dog Days" (1855), and its sequel "Eutaw" (1856). To the last class of his novels, or those founded on local history and the incidents of frontier life, belong "Guy Rivers" (1834), from which the German author Sealsfield has borrowed whole pages literally; "Richard Hurdiss" (1838); "Border Beagles" (1840); "Beauchampe, or the Kentucky Tragedy" (1842); "Helen Halsey" (1845); "The Golden Christmas, a Chronicle of St. John's, Berkeley" (1852); and "Charlemont, or the Pride of the Village" (1856). To the department of history and biography Mr. Simms has contributed a "History of South Carolina," "South Carolina in the Revolution" (1854), a reply to certain statements in relation to the course and conduct of the state, and lives of Gen. Marion, Capt. John Smith, the chevalier Bayard, and Gen. Greene. Under this head may also be included a "Geography of South Carolina," and a number of articles on the "Civil Warfare of the South" and the "American Loyalists of the Revolutionary Period," published in the "Southern Literary Messenger" and the "Southern Quarterly Review." His remaining works include "Views and Reviews in American Literature;" "Egeria, or Voices of Thought and Counsel for the Woods and Wayside," a collection of aphorisms

in prose and verse; "Father Abbot, or the Home Tourist, a Medley," "Southward Ho!" (1854), which has been described as "a species of Decameron, in which a group of travellers, interchanging opinion and criticism, discuss the scenery and circumstances of the South, with frequent introduction of song and story;" "The Morals of Slavery," &c. He has also edited with notes the 7 dramas ascribed to Shakespeare, but not published among his works, under the title of "A Supplement to Shakespeare's Plays," and has been a frequent contributor to periodical literature, beside delivering occasional orations before public bodies or literary associations. Many of the biographies of the statesmen, soldiers, and authors of South Carolina in this cyclopædia are also from his pen. Mr. Simms resides on his plantation of Woodlands near Midway, S. C., where he occupies himself chiefly with rural pursuits and literature. He has occasionally mingled in politics, but since 1845 has held no public position. He is an industrious and methodical worker, as the number and variety of his books testify, a careful observer of character and manners, and during extensive tours through the South and South-West has accumulated many of the incidents which form the groundwork of his novels. "His manners," as one of the most eminent of his contemporaries has remarked, "like the expression of his countenance, are singularly frank and ingenuous, his temper generous and sincere, his domestic affections strong, his friendships faithful and lasting, and his life blameless."

SIMODA, a port of entry in Japan, on the S. side of the island of Niphon, near the end of a rocky promontory indented by the little landlocked bay of Simoda. It is an inconsiderable place, being originally only a fishing village of 3,000 or 4,000 inhabitants, and in 1854 was visited by a severe earthquake which destroyed a large part of its fragile dwellings and nearly ruined its harbor. It was one of the 3 ports first opened to American trade by Commodore Perry's treaty in 1854, but is of much less importance than the other two.

SIMON, JULES, a French philosopher, born in Lorient, Dec. 31, 1814. He entered the normal school in Paris in 1832, was one of the most brilliant pupils of Cousin, and became professor of history and philosophy in the normal school in 1837, and deputy of Cousin at the Sorbonne in 1839. He was elected to the national assembly in 1848 by the department of Côtes du Nord, adhered to the moderate republican party, was prominent in the defence of the university against the attacks of Montalembert, and devoted himself especially to questions concerning public instruction, on which he was appointed to report the organic law. For political reasons his course at the Sorbonne was suspended Dec. 16, 1851, but he has since twice accepted invitations (in 1855 and 1856) to deliver lectures on philosophy in the principal cities of Belgium. His most important philo-

sophical works are: *Histoire de l'école d'Alexandrie* (2 vols., 1844-'5), *Le devoir* (1854; 5th ed., 1857), *La religion naturelle* (1856), and *La liberté de conscience* (1857). He has also edited, with valuable introductions, the works of Descartes, Bossuet, Malebranche, and Arnaud, has contributed occasionally to the *Revue des deux mondes* and frequently to the *Liberté de penser*, and published in 1861 *L'ouvrière*, a treatise on the conditions of female labor in Paris.

SIMON, RICHARD, a French Hebraist, born in Dieppe, May 13, 1638, died there, April 11, 1712. He entered the congregation of the Oratory at the age of 21, was professor of philosophy successively in the college of Juilly and in that of the Oratory in Paris, and in 1671 became involved in a controversy with the Port Royalists by a publication entitled *Fides Ecclesiæ Orientalis*. In 1678 appeared his *Histoire critique du Vieux Testament*, in which he attributes the authorship of the Pentateuch to scribes of the time of Esdras. It was violently assailed by Bossuet and suppressed, and the author excluded from the Oratory. He subsequently lived in Belleville, Dieppe, and Paris. Among his other works are: *Histoire critique de la création et des coutumes des nations du Levant* (Amsterdam, 1684); *Histoire critique du Nouveau Testament* (Rotterdam, 1689); *Histoires critiques des principaux commentateurs du Nouveau Testament* (Rotterdam, 1695); and *Nouvelles observations sur le texte et les versions du Nouveau Testament* (Paris, 1695). All his writings contained novel and ingenious views, and among his adversaries were Bossuet, Veil, Spanheim, Le Clerc, Jurieu, Le Vassor, and Du Pin.

SIMON MAGUS, a celebrated magician of the time of the apostles. By skill in the resources of magic he had attained such power and influence as to be called "the great power of God." But while Philip the Evangelist preached in Samaria, in A. D. 36, he not only saw himself abandoned by most of his followers, but was himself induced to apply for baptism. Soon after, when Peter and John came to Samaria, to impart to the new converts by means of prayer and the imposition of hands the gifts of the Spirit, Simon, supposing undoubtedly that in this lay the secret of a superior magic power, offered money to the apostles to impart to him this power. He was sternly rebuked for this offer by Peter, and appears no longer in connection with the rising Christian church. The statements of the ecclesiastical writers respecting his further life are highly contradictory. It seems certain, however, that he travelled through many countries to give exhibitions of his magic power, and that finally he settled at Rome, where, according to the testimony of Eusebius (with which a statement of Suetonius well agrees), he met his death in an aeronautic attempt. The ancient church fathers call Simon the first heretic and the parent of all heretics, and in particular the father of Gnostics, as, like them, he taught a recondite and remote supreme God, the reve-

lation of a divine power representing God, a series of sons, &c. In ethics he was theoretically and practically an Antinomian. About the middle of the 2d century his followers were still very numerous, and even Eusebius in the 4th century represents the Simonians as a powerful sect. They early split into several parties, of which the Menandrians, founded by Menander, a disciple of Simon who claimed to be a higher manifestation of God than he, and the Dositheans, founded by Dositheus, at first the teacher of Simon, were the most important. Simon wrote a number of works, of which only insignificant fragments are left, which are contained in Grabe's *Spici-legium*, vol. i.

SIMONE DI MARTINO. See MEMMI.

SIMONIAN, SAINT. See SAINT SIMON.

SIMONIDES, a Greek lyric poet, born at Iulis, in the island of Ceos, in 556 B. C., died in Syracuse in 467. He belonged to a family which is said to have held some hereditary office in connection with the worship of Bacchus, and in his youth was instructed in music and poetry. In the prime of manhood, having then acquired some celebrity as a lyric poet, he was invited by Hipparchus to Athens, where, with the exception of several years passed in Thessaly, he probably lived until his 80th year, when he was crowned for his victory in the dithyrambic chorus. His elegies on those who fell at Marathon and Plataea, his epigram on the tombs of the Spartans slain at Thermopylae, and his odes on the sea fights at Artemisium and Salamis, were celebrated for ages throughout Greece. The latter years of his life were passed in Sicily, at the court of Hiero of Syracuse. He was also the intimate friend of Themistocles, and of Pausanias, regent of Sparta. He is reproached by his rival Pindar and others with avarice, having been the first poet on record who wrote for money. He was the most prolific and probably the most popular lyric poet that Greece ever produced. A few fragments are all that remain of his writings, that known as the "Lament of Danaë" being the most celebrated. They are included in most collections of the Greek poets; the best separate edition is that of Schneide-win, *Simonidis Cei Carminum Reliquiae* (8vo., Brunswick, 1835).

SIMONY, the buying and selling of an ecclesiastical benefice, dignity, or preferment, or the causing an incumbent for a corrupt consideration to relinquish an ecclesiastical office. The term is derived from Simon Magus, who wished to purchase from the apostles the power of conferring the Holy Ghost (Acts viii. 18-24). Simony, according to Sir Edward Coke, is abhorrent to the common law, and is a grave ecclesiastical offence by the canons of the Roman Catholic church and the church of England.

SIMOOM (Arabic), or SAMIEL (Turkish), a hot, dry wind common in the hot months and about the time of the equinoxes in Syria, Arabia, Nubia, and India. It comes from the des-

erts, and is characterized by its excessive heat and suffocating effects. These increase the longer it continues, and if this be more than 3 days, which, according to Volney, is its usual period, they are very fatal to animal life. During its prevalence the inhabitants of towns and villages shut themselves up in their houses, and those in the deserts in their tents or in pits they dig in the earth. The extraordinary and parching heat, like that of an oven, is derived from the over-heated sands, which are whirled up from the earth by the advancing wind, and the whole air is filled with an extremely subtle and penetrating dust. When the wind blows in squalls, death is often very suddenly produced by actual suffocation, and is followed by hæmorrhage at the nose and mouth. Persons exposed to it protect themselves by stopping the mouth and nose with handkerchiefs, and the camels instinctively bury their noses in the sand. In a late report of the storms of India made to the British meteorological society, Dr. H. Cook describes the simoom of the deserts of Outchee and Upper Sinde as sudden and mysterious in its appearance, invisible and singularly fatal. It usually occurs in June and July, by night as well as by day, sometimes preceded by a cold current of air. Its course is straight and well defined on a narrow path. It is not accompanied by dust, thunder, or lightning, but has a decided sulphurous odor. Its heat is intense, like the blast of a furnace, and animal and vegetable life is generally destroyed along its path.

SIMPLICIUS, a philosopher of the Neo-Platonic school, born in Cilicia, flourished during the reign of Justinian. He was a pupil of Ammonius and Damascius in the school of Athens, which was the first to be attacked by the imperial decrees of the 5th century against the ancient religion. In consequence of the persecutions they suffered in behalf of a religion they were determined not to give up, 7 philosophers, one of whom was Simplicius, sought protection in the court of King Chosroes of Persia. Disappointed in their expectations in the East, they resolved to return, and the Persian king made it one of the articles of a treaty of peace with Justinian, that these 7 philosophers should be permitted to practise the faith of their fathers without being exposed to the penalties of the laws enacted against all pagans. After this the history of Simplicius is not known, although it is probable that he lived either in Alexandria or Athens, employing his time in teaching and writing. He composed commentaries on Aristotle's *Categorica Physica*, *De Celo*, and *De Anima*, and also one on the *Enchiridion* of Epictetus. His commentaries on Aristotle are the most valuable of all that have come down to us, furnishing us with many important fragments which otherwise would have been lost.

SIMPLON. See ALPS.

SIMPSON. I. A S. co. of Miss., bounded W. by Pearl river and intersected by Strong



river; area, 725 sq. m.; pop. in 1860, 6,080, of whom 2,324 were slaves. The soil is sandy, and there are extensive pine woods. The productions in 1850 were 165,099 bushels of Indian corn, 1,851 bales of cotton, and 83,207 lbs. of rice. Capital, Westville. II. A S. co. of Ky., bordering on Tenn. and intersected by Drake's creek; area, 375 sq. m.; pop. in 1860, 8,146, of whom 2,307 were slaves. The surface is level and the soil very fertile. The productions in 1850 were 516,168 bushels of Indian corn, 145,855 of oats, 1,221,314 lbs. of tobacco, and 521 bales of cotton. There were 11 churches, and 833 pupils attending public schools. Capital, Franklin.

SIMPSON, SIR JAMES, an English general, born in Edinburgh in 1792. He entered the army as ensign of the 1st foot guards in 1811, and served in the Peninsula from May, 1812, to the close of the war. In the campaign of 1815 he was severely wounded at the battle of Quatre Bras. For many years afterward he was employed in responsible positions at home and in the East, and in 1845, being then lieutenant-colonel, he acted as second under Sir Charles Napier in the campaign of Sind. He accompanied the British army to the Crimea as chief of the staff, and upon the death of Lord Raglan, in June, 1855, was appointed, chiefly in consequence of the favorable opinion of his ability which Sir Charles Napier had expressed, commander-in-chief of the forces. He added little to his reputation in this capacity, and was sharply censured for the failure of the British attack on the Redan, Sept. 8. In the succeeding November he resigned his command to Sir William Codrington, having shortly previous been promoted to the rank of general "for distinguished services in the field," and decorated with the grand cross of the order of the bath. In 1856 Napoleon III. conferred upon him the grand cross of the legion of honor.

SIMPSON, JAMES YOUNG, a Scottish physician, born in Bathgate, Linlithgowshire, in 1811. He was educated at the university of Edinburgh, where in 1832 he received his degree of M.D. He commenced his professional career as assistant to Professor Thomson, during whose temporary illness in 1836 he delivered a course of pathological lectures with great success. In 1840 he was elected professor of midwifery in the university of Edinburgh, a position which he has filled to the present time; and his lectures are said to have contributed more than those of any other professor to sustain the reputation of the Edinburgh school of medicine. Prof. Simpson was the first to apply the new discovery of anæsthesia to midwifery practice, which he did Jan. 19, 1847. He subsequently discovered the anæsthetic properties of chloroform, which in midwifery practice he regarded as more manageable and powerful, more agreeable to inhale, and less exciting than ether, and as giving greater control and command over the superinduction of the anæsthetic state. (See ANÆSTHETICS.) In 1849 Dr. Simpson was

elected president of the Edinburgh royal college of physicians, in 1852 president of the medico-chirurgical society, and in 1853 foreign associate of the French academy of medicine; and in 1856 he received from the French academy of sciences the Monthyon prize of 2,000 francs "in consideration of his services to humanity by the introduction of anæsthesia into the practice of midwifery, and the discovery of the anæsthetic properties of chloroform." His professional writings are numerous, the most important being those on obstetrics. Of his "Obstetric Memoirs and Contributions" an edition has been published in the United States under the editorial supervision of H. R. Storer, M.D., of Boston (2 vols. 8vo.). He has also published "Contributions to Obstetric Pathology," &c.; "Essays on Anæsthesia," and a "Treatise on Homœopathy," which have been republished in the United States; and several memoirs relating to the history or antiquities of his profession. Apart from his official duties, Dr. Simpson has a private practice probably exceeding that of any other physician in Edinburgh, his fame attracting patients even from the antipodes.

SIMPSON, THOMAS, an English mathematician, born at Market-Bosworth, Leicestershire, Aug. 20, 1710, died there, May 14, 1761. He was the son of a weaver, and worked at the same trade, but pursued a course of self-instruction which in a comparatively short time rendered him one of the most accomplished mathematicians in England. While still very young he married a woman 50 years of age, having two children, both older than himself; but the family lived in harmony, and Simpson worked steadily at his loom by day, employing his evenings in study and in keeping a school. In 1735 or 1736 he removed to London, where he for a time worked at his trade in Spital-fields, but was soon enabled to establish himself as a teacher of mathematics, while employing his leisure hours in researches into the higher branches of science. In 1743 he was appointed professor of mathematics in the royal military academy at Woolwich, a position which he filled until the close of his life, with great benefit to the pupils on account of the simplicity and perspicuity of his style of instruction. At the time of his death he was, according to Prof. Playfair, the only Englishman capable of competing with the great mathematicians of the continent, and had "solved with commendable neatness and brevity several of the most difficult questions of physical astronomy." In 1746 he was elected a fellow of the royal society, and many of his most important papers appeared originally in its "Transactions." He published works on fluxions, the laws of chance, annuities and reversions, algebra, geometry, trigonometry, logarithms, &c.; but his most valuable publication was a volume of "Miscellaneous Tracts" (1754), consisting of 4 papers on pure mathematics and 4 on physical astronomy.

**SIMROCK, KARL**, a German poet and author, born in Bonn, Aug. 28, 1802. He was educated at the university of Bonn, where he studied law, and in 1823 entered the service of the Prussian government in the law department. In 1827 he published a translation of the *Nibelungenlied*, which passed through several editions, that of 1840 containing 20 additional songs pronounced to be genuine on the authority of Lachmann. An original poem referring to the French revolution of July, 1830, published in that year, cost him his position in the Prussian service. Since that time he has devoted himself exclusively to literature, and since 1851 has been professor of the German language and literature in the university of Bonn. His principal works are: *Quellen des Shakespeare in Novellen, Märchen und Sagen* (2 vols., Berlin, 1831), published in conjunction with Echtermayer and Henschel, and of a portion of which an English translation edited by Mr. Halliwell was printed by the Shakespeare society in 1850; *Novellenschatz der Italianer* (1832); *Wieland der Schmied* (Bonn, 1835), a poem written in the ballad style, and relating the adventures of a legendary Teutonic hero of the early ages; *Rheinsagen, &c.* (4th ed., 1850), a collection of popular tales; a descriptive work entitled *Das malerische und romantische Rheinland* (Leipsic, 1839); *Handbuch der Deutschen Mythologie* (vol. i., Bonn, 1853); and many volumes of ancient tales and legends in prose and verse, under the titles of *Deutsche Volksbücher* and *Das Heldenbuch*, beside a collection of his own poems, ballads, and legends (1844).

**SIMS, JAMES MARION**, an American surgeon, born in Lancaster district, S. C., Jan. 25, 1813. He was graduated at the South Carolina college in 1822, studied medicine at Charleston and at the Jefferson medical college, Philadelphia, and commenced practice at Montgomery, Ala., in 1836. He soon became widely known as a skilful operator in general surgery, attracting patients from all parts of the southern states. He also excited the interest of the medical profession by his novel theory concerning the nature and origin of *trismus nascentium*, which he embodied in a series of papers published in the "American Journal of Medical Sciences" in 1843. About 1845 his attention was especially directed by constantly recurring cases to the treatment of vesico-vaginal fistula, hitherto deemed incurable; and, establishing a private hospital at Montgomery for the diseases peculiar to women, he commenced a series of experiments which after 4 years of constant effort were crowned with complete success by the substitution of sutures of silver wire for the silken and other sutures hitherto employed by the medical profession. He afterward extended the use of metallic sutures into every department of general surgery, where their superiority is now universally acknowledged. After supporting his hospital at Montgomery at his own expense for 4 years, he was forced by failing health to abandon it, and to seek a northern climate. In

1853 he removed to New York, where he conceived the idea of establishing a large hospital devoted exclusively to the treatment of diseases peculiar to women, and submitted his plans to the public in an address delivered on May 18, 1854, before an audience of over 400 physicians. The result was the formation of a woman's hospital association, consisting in part of ladies, under whose auspices a temporary institution was opened, Dr. Sims holding the position of attending surgeon, which was soon filled to overflowing with patients from all parts of the Union. In 1858 the common council of New York set apart land valued at \$100,000 as a site for a state woman's hospital, in addition to a money grant of \$2,500. Previously to this the state legislature had appropriated \$10,000 in aid of the funds of the association, and during the session of 1860-'61 it bestowed a further sum of \$50,000 upon the institution; and it has also received considerable donations from private sources. The records of the woman's hospital show that of 261 cases of vaginal fistula (vesical and rectal), a disease seldom if ever before cured, 216 have been permanently cured by the silver wire suture, 86 are curable, and 9 are incurable. Dr. Sims has now (Dec. 1861) in preparation a large work on vaginal fistula, comprising a clinical report of the results of his experience in the woman's hospital and in his private practice. He has also prepared for publication a monograph on *trismus nascentium*, in elucidation of the theory referred to above. He has published a paper on "Amputation of the Cervix Uteri," an operation into which he has introduced important modifications; one on "Silver Sutures in Surgery," and various contributions to medical journals. In 1861, with a view of inspecting the hospitals of Europe, he visited most of the European capitals, where his skill and important discoveries have been most generously recognized.

**SIMSON, ROBERT**, a Scottish mathematician, born at Kirton Hall, Ayrshire, Oct. 14, 1687, died Oct. 1, 1768. He was educated at the university of Glasgow, and in 1711 succeeded Dr. Robert Sinclair as professor of mathematics, which position he occupied for 50 years, discharging the duties of the office during nearly all that time without assistance. He early directed his attention to studies of a pure geometrical kind, and the restoration of the works of the Greek geometers was the main object of his scientific career. In 1746 he published a restoration of the *Loci Plani* of Apollonius, and in 1758 an edition of Euclid's *Elementa* and *Data*. In 1776 appeared a posthumous edition, published at the expense of Earl Stanhope, of his restorations of Euclid's books of "Porisms" and of two books of Apollonius *De Sectione Determinata*. He also left a manuscript edition of the works of Pappus, which was presented by his executors to the university of Oxford. His edition of Euclid has been widely used in elementary instruction.

SINAI, a group of mountains, in Arabia Petræa, in the southern portion of the peninsula of the same name, which projects between the two forks of the Red sea, the gulf of Suez, separating it from Egypt on the W., and the gulf of Akabah, from Arabia on the E. The peninsula of Sināi is triangular in shape, about 140 m. in length from N. to S. and nearly the same in breadth at its widest portion. The northern portion is an arid and desert plain, with sand hills and mountains of small elevation; below the 29th parallel it rises into 4 ranges of mountains. There are numerous peaks, ranging from 1,000 to over 9,000 feet above the sea, divided by deep wadys or narrow sand valleys, except in the case of the Wady er-Raheh and the Wady es-Sheik, two wide valleys, the former separating the Jebel el-Ghubsheh from the Jebel el-Fureia, the latter the Jebel ed-Deir from the same mountain summit, and the two uniting in a wide plain in front of the Ras Sasafeh, the abrupt northern termination of the Jebel Musa or Mount of Moses, the traditional Sinai. The summits of most historic and biblical interest, beginning at the S. point of the peninsula, are the Jebel et-Turfa, a long low mountain sloping on either side to the sea and terminating in the low promontory of Ras el-Mohammed; the Jebel et-Tur, a series of summits of somewhat greater height surrounding the Jebel Musa, and separated from it by narrow steep wadys; the Jebel Katherin, S. S. W. of the Jebel Musa, and forming the termination of the range known as the Jebel Humr; and the Jebel Musa, an isolated summit, with a plateau about  $3\frac{1}{2}$  miles long and nearly one in width, gradually descending toward the N. The S. point, from which until recently it was supposed that Israel received the law, is 9,274 feet high, but is still overlooked by the higher peaks of Jebel Katherin and the Tiniah ridges, and the wadys in front of it are so narrow that the immense congregation could not have seen the summit of the mountain. To avoid this difficulty, which observant travellers have long felt, Burckhardt, and after him Lepsius and some others, have attempted to demonstrate that the Jebel Serbal, which was sometimes called "the mount of God," lying some distance W. of the Jebel Musa, and having a valley of considerable extent, the Wady Feiran, at its N. face, is the true Sinai. This supposition is attended with quite as many difficulties as the former, and is not now held by the best authorities. The N. extremity of the Jebel Musa, called by the Arabs Horeb, and at its termination Ras Sasafeh or "the mountain of the willow," is supposed by Robinson and others to be the Sinai from which the law was dispensed. It is divided from the Jebel ed-Deir on the W. by a narrow valley, on one of the slopes of which the convent of St. Catharine is situated; but from the termination of the Ras Sasafeh there open out the two wide valleys already mentioned, the Sheik and the Raheh, the only ones in the Sinaitic peninsula capable of

containing the vast host of Israel. Opposite, in a succession of terraces, rises the Jebel Sena, the termination of the ridge known as the Jebel el-Fureia. The Ras Sasafeh is 7,688 feet high, or nearly 1,600 feet lower than the Jebel Musa, but it is the commanding point of the amphitheatre upon which it opens. There are 3 churches and 8 chapels on this mountain, all small and in a ruinous condition; and on the W. side, 2,000 feet below the summit, is the monastery, celebrated alike for its antiquity, its manuscript treasures, and the hospitality of its monks. The Arabs point out in the Wady er-Raheh the "hill of Aaron," the "pit of Korah," and the place where the molten calf was made. The late Carl Ritter suggested that Serbal was known before the giving of the law as "the mount of God," and that Pharaoh probably understood it as the mount to which they were going to sacrifice. Its distance and location well agree with this theory, for which early traditions give much ground. From an early period, certainly not later than the first half of the 3d century, the caves of Mt. Sinai were a refuge of persecuted Christians; in the 4th century they were the resort of anchorites and ascetics, and these were repeatedly attacked and murdered by the Arabs. In the 5th and 6th centuries, the monks of Mt. Sinai were represented in the great councils of the eastern church. During the period in which the Mohammedan power was at its height, the monks lived in constant fear and disquiet, often threatened and occasionally attacked. From the crusades onward they have held more peaceful possession, but with greatly diminished numbers and influence.—See Forster's "Historical Geography of Arabia" (2 vols. 8vo., London, 1844); Busching, *Erdbeschreibung*; Bartlett, "Forty Days in the Desert" (London, 1850); Robinson, "Biblical Researches" (3 vols., Boston, 1856); Stanley, "Sinai and Palestine" (London, 1858); Carl Ritter, *Erdkunde*, vols. xiv.-xvii.

SINALOA, or CINALOA, a state of the Mexican confederation, bounded N. and N. W. by Sonora, N. E. and E. by Durango, S. E. and S. by Jalisco, and S. W. by the gulf of California and the Pacific; area, 32,586 sq. m.; pop. 160,000. Capital, Culiacan; other chief towns, Mazatlan, Sinaloa, and Santa Cruz. The state lies mostly W. of the Sierra Madre, though a spur from that chain extends over a portion of the S. E., and the surface, low on the sea shore, rises rapidly toward the eastern border. The principal rivers are the Rio del Culiacan, the Rio del Fuerte, and the Mayo. The soil of the lowlands toward the coast is sandy, but fertile wherever it can be irrigated. The mountains are in their lower terraces without wood, or only covered with shrubs and stunted trees; but toward the Sierra Madre there are dense and lofty forests. The rainy season commences about June 20, and lasts two months; previous to this the earth is parched and appears like a desert. There

are extensive gold mines near Sinaloa, and a mint at Culiacan, which in 1856 coined \$938,204. Many cattle are raised in the state, and the hides and flesh exported.

SINCLAIR, SIR JOHN, a Scottish philanthropist and agricultural reformer, born at Thurso castle, Caithness, May 10, 1754, died Dec. 21, 1835. He was educated at the universities of Glasgow and Oxford, and in 1775 was admitted a member of the faculty of advocates; subsequently he was also called to the English bar, but never followed the law as a profession. In 1780 he was elected to parliament for the county of Caithness, where his hereditary estate amounted to 100,000 acres, about a fourth part of the entire county; and for the next 30 years he occupied a seat in that body as member for Caithness and for several English constituencies. He published in 1783, during a time of universal financial gloom and despondency, a pamphlet entitled "Hints on the State of our Finances," which had much influence in causing a general banking system to be introduced into England. Between 1785 and 1787 he made an extensive continental tour, and upon his return to Scotland instituted important improvements in the national agriculture, the benefits of which were first practically tested on his own estates in Caithness. These soon increased greatly in value from the systematic and intelligent cultivation which he required of his tenants, and the population which they supported showed a corresponding improvement in material prosperity and in morals. Not content with developing the agricultural resources of Caithness, he revived the fisheries along the coast, and, by the assistance of government, built up the miserable fishing village of Thurso into a flourishing port. Subsequently he occupied himself with projects for the improvement of wool, and for that purpose established a society of which he became the president. The board of agriculture established by act of parliament in 1793, mainly through his exertions, and of which he was the first president, gave a great impulse to farming interests, and under its auspices agricultural surveys of the kingdom were first made on a comprehensive and satisfactory scale. Similar in character, though of greater magnitude, was the "Statistical Account of Scotland," commenced in 1790 and finished in 1798 (21 vols.), which is a model work of its class. In 1794-'5 he raised two full regiments of Caithness highlanders, which were the first fencible bodies whose services were extended out of Scotland. A few years later, as the result of his investigations in the laws of hygiene, he published the "Code of Health and Longevity" (4 vols., Edinburgh, 1807), which met with much severe criticism from the medical profession. He retired at about the age of 60 from public life, and thenceforth busied himself principally with agriculture. He is said to have been the author either by suggestion or indorsement of 367 books and pamphlets, and

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his own "Hints," "Plans," "Proposals," "Observations," &c., were produced almost without cessation. In addition to the works mentioned, he published "A History of the Public Revenue of the British Empire" (3 vols., 1784), a "Ode of Agriculture," "Essays on Agriculture," papers on the "Billion Question," &c., and edited the so called "originals" of the Ossianic poems, in the authenticity of which he was a firm believer. In 1830 appeared also two volumes of his correspondence. It is said that at the time of his death he had made considerable progress in a "Political Code" and a "Code of Religion." His memoirs have been written by his son, the Rev. John Sinclair (2 vols., 1837). He was created a baronet in 1786, and during the greater part of his life held the office of privy councillor.—CATHARINE, a Scottish authoress, daughter of the preceding, born in Edinburgh, April 17, 1800. She acted as secretary for her father during the latter part of his life. Her career as an authoress properly commenced in 1835, when she published her first novel, "Modern Accomplishments," which was followed in the succeeding year by "Modern Society, or the March of Intellect." Her next works, "Hill and Valley" and "Scotland and the Scotch," were of a descriptive character, and in "Holiday House" (1839) she gave some reminiscences of her own childhood. The "Journey of Life" and the "Business of Life" were in a more serious strain. Her succeeding novels comprise "Modern Flirtations, or a Month at Harrowgate," "Lord and Lady Harcourt," "Sir Edward Graham," "Jane Bouverie," "Beatrice," "Cross Purposes," and others, most of which have been widely circulated in England and America. She has also written the "Kaleidoscope of Anecdotes and Aphorisms," "London Homes," and a number of miscellaneous works and books for children. Of late years her attention has been occupied by the superintendence of a charitable institution for widows of officers of the army.

SINDE, SCINDE, or SINDH, a territory of British India, bounded N. by Beloochistan and the Punjaub, E. by the Rajpoot states, S. by Cutch and the Indian ocean, and W. by the Indian ocean and Beloochistan; area, 60,240 sq. m.; pop. 1,900,000. The N. part of the country is usually spoken of as Upper Sind, and the S. as Lower Sind. The chief towns are Hyderabad, the capital, Kurrahee, Sukur, Shikarpoor, and Tatta. The sea coast extends between the Roree mouth of the Indus and Cape Monze, a distance of about 150 m.; with the exception of about 15 m. at the N. extremity, it is very low, and fronted by mud banks deposited by the Indus, with sand hills blown up from the sea beach in a few places. At high water the shore is overflowed for a considerable distance inland; there are only a few places wooded, the remainder being merely a swamp. Sind is traversed throughout its length by the Indus, and the country and river bear a striking resemblance to Egypt and the Nile. The delta

of the Indus is overflowed for several miles inland by spring tides, and becomes submerged during the season of the floods in the river. The Hala hills extend along the W. frontier, but the most elevated points do not exceed 1,500 feet above the sea. The Indus has entirely deserted the Rorce mouth, and the E. part of the country has consequently become to a great extent desert, and covered with shifting sand hills, but still affords some pasturage, more particularly for camels. In the N. part there are extensive tracts of jungle, formerly preserved as hunting grounds for the rulers of the country, but now used for supplying the steamers on the Indus with wood for fuel. The climate is remarkably hot and dry. At Hyderabad the mean temperature of the 6 hottest months is 98°, and in Upper Sindh it sometimes rises to 120°; but in winter frost is not unknown. The periodical rains or monsoons which refresh other parts of India do not visit Sindh; and there is little rain, though heavy falls occur at long intervals in Lower Sindh. Upper Sindh is tolerably healthy, and many of the natives attain a great age; but in the lower country, particularly toward the mouth of the Indus, there is much malaria and fever, and cholera sometimes commits great ravages.—Alum, sulphur, iron ore, and limestone are found; and many fossils, shells, and specimens of petrified wood have been discovered. The soil of the delta of the Indus is a light clay mixed with sand, and the land on the banks of the river is made fertile in the same manner as that on the banks of the Nile. Grasses abound which attain a height of 15 or 20 feet. Cotton of excellent quality is grown, and sugar cane and tobacco succeed well, beside rice and all the other common crops; but agriculture is carried on in a very slovenly manner. Tigers are found in the jungles, but are seldom seen in Lower Sindh, and panthers, hyænas, jackals, foxes, and wolves are common. Hog-deer, the antelope, ibex, and wild hogs are numerous. Large numbers of buffaloes are bred in the marshes, and many camels in the delta of the Indus. Partridges, snipes, quails, and wild ducks are numerous; and the pelican, falcon, and bustard are among the most remarkable species of the feathered tribes of the country. Alligators grow to a great size, but seldom prey on man, and are not so numerous in the Indus as in the Ganges. A river porpoise which weighs upward of 200 lbs. is found, and fish are very abundant. Insects are exceedingly numerous and annoying. The white ant is particularly destructive, and the woodwork of houses is often completely hollowed out by them.—The inhabitants are made up of mixed races, principally Jats and Beloochees. About  $\frac{1}{3}$  of the population are Hindoos, and the remainder, with the exception of about 50,000 of other sects, profess the Mohammedan religion. The Sindians are tall, well made, and handsome, and the women are remarkably good-looking. They are idle in their habits, exceedingly immoral,

ignorant, and bigoted. Their language is a compound of Sanscrit and Arabic. Some manufactures are carried on in the principal towns, and the people are very ingenious workmen. Silk goods are made from materials imported from Persia and China, and different kinds of cloth, earthenware, and cutlery are manufactured. The foreign trade has of late years become considerable. Some traffic is carried on with Cabool through the Bolan pass. A railroad connects Kurrachee and Hyderabad. —When Alexander the Great invaded India, Sindh was ruled by Hindoo princes, who had extended their conquests over all the countries lying between the Indus and the Ganges. Little is known of Sindh from that time till A. D. 711, when it was conquered by the army of the caliph Abd el Malek, and was ruled by him and his successors till 1026. It was then conquered by Mahmud of Ghuznee; but from the end of that century till 1541 it was governed by two native dynasties, and then fell into the power of Shah Beg Argoon of Candahar. In 1590 it was incorporated with the Mogul empire under Akbar, in 1739 with the Persian under Nadir Shah, after whose death it reverted to the former, and in 1756 passed by dowry to the ruler of Cabool, remaining a nominal dependency of Afghanistan till the suppression of the Doornee dynasty in 1818, though governed by native princes or nabobs, and refusing tribute except upon compulsion. In 1786 the reigning family, of the Kooloor tribe, was overthrown by Meer Futteh Ali, a Beloochee chief of the Talpoor tribe, who divided the country into 3 independent states, each under several ameers, of whom in 1839 there were 4 in Hyderabad, 3 in Khyerpoor, and 2 in Meerpoor. Under these chiefs the government was a military despotism, and the relations between them and the English East India company were never very friendly. About the beginning of the present century the company's agent was violently expelled, and a large amount of property in his custody confiscated. Subsequently several treaties were made; and in 1838, to facilitate the operations of its army in the contemplated Afghan war, the company extorted concessions from the ameers by which Sindh was made virtually one of its dependencies. The disasters of the British in Afghanistan having encouraged the ameers to commit hostile acts, a military force was sent thither under Sir Charles Napier, who, after concluding a treaty with the ameers of Lower Sindh, found himself compelled to take the field; the result was the brilliant victory of Meeanee (Feb. 17, 1843), the rapid conquest of the country, and the establishment of British authority. (See NAPIER, SIR CHARLES JAMES.) Ali Moorad of Khyerpoor, who had throughout maintained his friendship for the British, was allowed to retain his possessions. Under its present rulers Sindh is rapidly improving, old canals have been reopened, villages are being built, a railway crossing the country has been made, and

lands which have lain waste for more than half a century are now under cultivation.

**SINDIA, FAMILY OF.** See Gwalior.

**SINE**, in trigonometry, a line drawn from one extremity of an arc perpendicularly to the diameter drawn through the other extremity. It is spoken of either as the sine of an angle or of the arc which measures the angle. Cosine is the sine of the complement of an arc. Versed sine is the distance on the radius from the foot of the sine to the extremity of the arc.

**SING SING**, a village of Westchester co., N. Y., beautifully situated on high ground on the E. bank of the Hudson river, at its widest part, called Tappan bay, 33 m. N. from New York; pop. in 1860, 3,857. It has 5 churches, several schools, 2 newspaper offices, a bank, and a state prison. The male prison was erected by convicts, the first draft of whom, from Auburn state prison, commenced work in May, 1825. It contains 1,200 cells, is 484 feet long by 44 feet wide and 6 stories high, with ranges of workshops running at right angles, 40 feet wide and 2 and 3 stories high. It receives convicts from the 1st and 2d judicial districts, with the addition of Ulster, Greene, and Sullivan cos. The female prison, with 120 cells, is on the E. side of the male prison, and under separate management; it was commenced in 1835, and receives female convicts from every county in the state. Both buildings are of white marble. The number of convicts on Jan. 1, 1862, was 1,277 males and 135 females. The Hudson river railroad runs through the prison grounds under arches.

**SINGAPORE**, an island of British India, situated at the S. extremity of the Malay peninsula, separated from the mainland by a strait from  $\frac{1}{2}$  to 2 m. wide; area, 275 sq. m.; pop. in 1860, 81,792. Like all the islands in the neighborhood, it is thickly covered with jungle. Near the coast there are some swampy tracts, but a little way inland the surface rises and becomes undulating. The thermometer ranges between  $71^{\circ}$  and  $89^{\circ}$ , the average temperature in summer being  $84^{\circ}$ , and in the colder months of December and January  $76^{\circ}$ . Rain falls frequently, the annual average being 102 inches, and the climate is remarkably healthy. The forests contain much timber well suited for nautical purposes, particularly for masts and spars. Nutmegs and all kinds of spices grow well; and sugar cane and cocoanut trees are extensively cultivated. Tigers are exceedingly numerous and troublesome, and as they make their way over to the island from the mainland, it is almost impossible to reduce their numbers; and there are many other wild animals. About 50 per cent. of the inhabitants are Chinese, and 25 per cent. Malays; the remainder consist of a few Europeans and the different races of Hindostan, about 1,500 of whom are convicts, Singapore being used as a penal establishment by the government of India. The governor of Singapore is also governor of Penang and Malacca, and is styled the governor of the Eastern Straits

Settlement. His deputies reside at these places, and Penang is officially supposed to be the chief establishment. The Eastern Straits Settlement is subordinate to the governor-general of India; and the military force of Singapore consists of about 700 sepoy of the Madras army. Singapore was anciently settled successively by the Malays and the Javanese; but when the British obtained from the king of Johore in 1819 permission to form a commercial establishment upon the island, it had only 150 inhabitants. By treaty in 1824, in consideration of \$60,000, and a life annuity of \$24,000, the sultan transferred the sovereignty and fee simple of Singapore, and of all the seas and islands within 10 geographical miles, to the British.—**SINGAPORE**, the capital, is situated on the S. side, upon both banks of a small river of the same name. It may be considered as 8 towns, inhabited by 3 distinct races, Chinese in the W. or commercial part, Europeans in the centre, separated from the former by the river, and natives of the archipelago and neighboring mainland to the E. The town contains a missionary and an Armenian church, several Chinese pagodas, native schools, and an institution founded by Sir Stamford Raffles for the cultivation of the various languages of the archipelago, Siam, China, &c. The roads of Singapore afford excellent anchorage for vessels of all descriptions; cargoes are discharged into lighters and taken direct to the quays on the banks of the river, near which the warehouses are situated. The number of vessels cleared from Singapore in 1856 was 1,042; and the value of the imports in the same year was \$24,385,455, and of the exports \$21,506,930. Most of the commercial nations of the world have some share in this trade, but it is principally carried on with Great Britain, India, Siam, China, and the islands of the archipelago. Some 200 junks sail annually from China about the month of January and arrive at Singapore with the N. E. monsoon, their cargoes consisting of tea, camphor, cloth, and other articles. When the opposite monsoon sets in, about April, they return with pepper, tin, edible birds' nests, opium, &c. From its geographical position, as well as from its being a free port for ships of all nations, Singapore has become the great centre for the trade of S. E. Asia, and is still rapidly increasing. Steamers plying between India and China stop for coals at Singapore; and mail branches from the Philippines and Batavia join the main line there for Suez and Europe.

**SINOPE** (Turk. *Sinub*), a fortified seaport town of Asiatic Turkey, pashalic of Anatolia, on the shore of the Black sea, 350 m. E. N. E. from Constantinople; pop. about 12,000. It stands on an isthmus that connects the mainland of Asia Minor with a high rocky peninsula called Cape Sinope, which forms an excellent roadstead on its S. E. side. The town has an arsenal and a building yard, where many of the Turkish war vessels are built. The timber of the neighboring forests, particularly oak, is well suited for ship

building, and a considerable quantity is exported. The general trade is not very important.—Sinope stands on the site of an ancient Greek city of the same name. It was colonized from Miletus, and after the colony had been expelled by the Cimmerians a second was sent who refounded the town, 632 B.C. It soon after rose into importance, and continued independent till 183 B.C., when it was captured by Pharnaces, king of Pontus, of which country it became the capital. It was much ornamented and improved by Mithridates the Great. Having been conquered by the Romans, it was made a colony by Julius Cæsar. Diogenes was a native of Sinope.—In the late Russian war, the Turkish fleet, with the exception of one steamer which escaped, was destroyed here with a loss of about 4,000 men, Nov. 30, 1853; it consisted of 6 frigates, 3 corvettes, and 2 steamers, and was attacked by a superior Russian force under cover of a fog. The town was bombarded and suffered very severely, and the fortifications are now in a ruinous state.

SIOUT, SYOOT, or OSOOT (anc. *Lycopolis*), a city and the capital of Upper Egypt and of a province of its own name, situated near the left bank of the Nile, 75 m. N. W. from Girgeh, under a hilly ridge of sand cliffs, which have been extensively excavated; pop. 25,000. It has some beautiful mosques, and also some good bazaars and baths; but with these exceptions it is a collection of mere hovels. It was until lately the principal seat of the slave trade in Egypt, and is still the entrepot of that between Cairo, Darfoor, and Sennaar. It is an important military station, and has a large manufactory of pipe bowls, of which considerable quantities are exported. There are the remains of a Roman amphitheatre, vast rock tombs of the 12th dynasty, and ancient alabaster quarries on the opposite range of hills.

SIOUX, a new N. W. co. of Iowa, bounded W. by the Big Sioux river and intersected by the Inyan Reakah; area, 525 sq. m.; pop. in 1860, 10. The surface is nearly level and the soil productive.

SIOUX, a powerful tribe of Indians in Dacotah territory, ranging with other tribes from the Blue Earth region to the Rocky mountains. They call themselves Dacotahs, and are a brave and warlike nation. They are almost constantly engaged in wars with the Chippewas, from whom they are separated by the Mississippi, and toward whom they cherish the most deadly animosity. They formerly numbered nearly 30,000, and had 7,000 warriors; but their number in 1853 was estimated at only 8,000. Nearly 200 years ago they were visited by French Catholic missionaries, and they are further advanced toward civilization than any other tribe in the North-West. The Assiniboins formerly belonged to this tribe. They believe in the existence of a Supreme Being and a number of subordinate deities. They cultivate corn, beans, and pumpkins, beside hunting and collecting furs.

SIPHANTO (anc. *Siphnos*), a Grecian island, one of the group of Cyclades, 25 m. W. from Syra; area, about 34 sq. m.; pop. 5,000. The soil is fertile and well cultivated; the principal productions are corn, silk, figs, wax, and honey. In ancient times the island was colonized by the Ionians from Athens, and its extensive gold and silver mines made it in the time of Polycrates the wealthiest of the Greek islands. Its treasury at Delphi, in which was deposited  $\frac{1}{10}$  of the produce of the mines, was equal to that of the richest states of Greece, and its public buildings were decorated with Parian marble. The Siphnians refused to pay tribute to Xerxes, and in the battle of Salamis they furnished a ship to the Greek fleet. Under the Athenian supremacy they paid 3,600 drachmas of annual tribute. Subsequently their mines became less productive, and a part of them were destroyed by an inundation. In the time of Strabo they had become poor even to a proverb, and their immorality was such as to make them a byword. The island had anciently 3 considerable towns, Siphnos, Apollonia, and Minoa; it has now but one, on the E. slope of the island, Kastron or Seraglio. There are considerable ruins of its ancient temples.

SIPHON, a bent pipe with one arm longer than the other for drawing liquids over the upper edge of vessels. The short arm is introduced into the liquid, and the long one descends to a lower level outside. The tube being filled with the liquid by suction or otherwise, a current continues to flow up the short arm and down the longer one. Its movement depends upon the pressure of the atmosphere, which is exerted upward at each end with equal force, and upon the preponderating weight of the column of liquid in the longer arm. If each end of a bent tube with equal arms be turned up to form a cup, and the tube be filled with water, it will remain filled when suspended by the middle of the bend, provided the height of the column is not more than 34 feet at the level of the sea. If one end be immersed in a vessel of water, and the other hanging outside be canted so as to bring it below the surface of this water, an unequal downward pressure is exerted in the two arms against the equal upward pressure. The water in the longer arm preponderates by its greater gravity, and descending is immediately replaced by that pushed up the shorter arm. The bent tube turned up at the ends is known as the Württemberg siphon, and is a convenient form of the instrument, being always kept filled and ready for use. An arrangement for conveniently filling a siphon when it is placed in the fluid to be drawn off, consists in a small side tube inserted into the end of the long arm and provided with a stopcock. The aperture of the long arm is temporarily stopped, and the air is sucked out through the small tube, which is then closed and the aperture opened. The use of siphons is limited like that of pumps to heights at which the column of the fluid to be



raised is nearly equal to that of the atmosphere at the place. Within these limits they have sometimes been applied as a means of drawing off ponds and furnishing supplies of water over margins that could not conveniently be cut through. The length and shape of the exhausting pipe is of no consequence, if it be airtight and firm enough to resist the external pressure of the air.—Siphons are a much more ancient invention than pumps. They were in use by the Egyptians full 15 centuries B. C., and their application to drawing liquors from their vases is shown in the drawings preserved in their tombs. Heron of Alexandria, of the time of Ptolemy VII., describes their use on a grand scale for draining lands, or conveying water over a hill from one valley to another. The name is said by Wilkinson ("Ancient Egyptians," vol. ii. p. 318) to be "evidently oriental, and derived from the word *siph* or *sif*, to imbibe or draw up with the breath, analogous to and perhaps the origin of our own expression 'to sip.'"

SIRACH, SON OF. See ECCLESIASTICUS.

SIRANG. See CERAM.

SIREN, a North American long-tailed batrachian, with stout eel-like body, naked skin, persistent branchiæ, and only the 2 anterior legs. The best known species, the *S. lucertina* (Linn.), or mud eel, has a small and short head, with elevated forehead and depressed and truncated snout, 3 branchial tufts, and 3 spiracles on each side; the mouth is small, with distinct lips, and arrow-shaped tongue free at the tip and sides; no teeth in the upper jaw, but a broad band of very minute ones along the outer border of the palate bones; nostrils and eyes small, the latter black; the tail laterally compressed, with a rayless fin above and below; limbs with 4 short and small fingers with horny tips. It attains a length of from 2 to 3 feet, and is dusky above with numerous whitish spots, and purplish below; it lives chiefly in the mud and muddy water of the Carolina rice fields, and is often thrown out when the ditches are cleared; it occasionally comes on land. Its food consists of worms, insects, and the eggs of fish and frogs; it is sometimes caught on a worm bait by anglers for the common bream (*pomotis*); it is regarded as venomous by the negroes, and is always destroyed when taken; it is found from lat. 35° N. to E. Florida. Its discoverer, Dr. Garden, sent it to Linnæus with marvellous stories about its habits, among others that it fed on serpents and had a kind of singing voice; from the latter the generic name was derived. Like other perennibranchiates, it was regarded by the earlier naturalists as the larva of some salamander. Two other species, the *S. intermedia* and *S. striata*, have been described by J. Le Conte, from the same localities and with similar habits, but much less in size; the latter has only 3 fingers on each limb. In this group there are about 90 vertebræ, connected by conical cavities filled with a gelatinous substance, as in fishes; 8 pairs of

short ribs, of which the 1st pair is attached to the 2d vertebra; no trace of pelvis; 3 cartilaginous branchial arches attached to an osseous tongue bone; the lungs 2 long sacs, accessory to the gills, but, as in the menobranchus, insufficient of themselves for respiration.

SIRENS, in ancient mythology, sea nymphs who enchanted the listeners to their song, and after getting them into their power destroyed them. In the legends of the Argonauts they are said to have endeavored to entice those wanderers, but Orpheus surpassed them in singing; thereupon they threw themselves into the sea, and were changed into rocks, as it had been fated that they were not to live after any one passed by them unaffected. In Homer the sirens are connected with the voyage of Ulysses, who, preparatory to sailing by the islands on which they were sitting, by the advice of Circe plugged the ears of his companions with wax and fastened himself to the mast of the vessel, until he was out of the sound of their voices, thus escaping destruction. The island in Homer's account was between *Ææa* and the rock of *Scylla* on the S. W. coast of Italy. Later poets represent them as furnished with wings; but having been persuaded to enter into a musical contest with the Muses, they were beaten and deprived of those appendages. The number of the sirens was variously stated as 2 or 3; their place of abode as on Cape Pelorum, on the island of Anthemusa, in the Sirensian islands near Pæstum, or in Capræ; and they were called daughters of Phorcus, of Achelous and Sterope, of Terpsichore, of Melpomene, of Calliope, or of Gæa.

SIRHIND, a territorial division of Hindostan, bounded N. by the Punjab, E. by Sirmour and other hill states, and by the British districts of Saharunpoor, Paniput, and Rohtuck, S. by Rohtuck and Hurreana, and W. by Bahawalpoor; area, about 17,000 sq. m. In the extreme N. E. a spur of the Himalaya projects into the territory, but the whole of its remaining surface is a uniform plain, sloping very gradually to the S. E., and broken only by water courses or some low sand hills. The mountains in the N. E. divide the head waters of the Sutlej from those of the Jumna. It is traversed by numerous small streams, mostly affluents of the Jumna, whose annual inundations render the soil fertile. An important addition to the means of irrigating this great plain is the Firoz canal, originally constructed by command of Firoz Toglook, Afghan sultan of Delhi in 1351-'88, which with its various branches is 240 m. long, and for much of its course is parallel with the Jumna. The country is inhabited by Sikhs, and the greater part of it governed by native chieftains under the protection of the British government. The districts of Ferozepore, Umballa, Ludiana, and Kythul have been at different times escheated to the East India company.—SIRHIND, the ancient capital of this territory, was once a city of great importance, having been founded by

Firoz in 1357, but was repeatedly captured in the fierce wars of the Sikhs, and is now in ruins.

SIRIUS. See DOG STAR.

SIRMIUM, an ancient city in the S. E. part of Lower Pannonia, on the left bank of the Savus (Save), just below its junction with the Bacuntius. During the war against the Dacians and other Danubian tribes, it was the principal depot of Roman military stores, and finally became the chief city of Pannonia. It was probably a Roman colony. It contained a large manufactory of arms, a spacious forum, an imperial palace, and other public buildings, and was the residence of the admiral of the first Flavian fleet on the Danube. The emperor Probus was born here. It was captured and probably destroyed by the Avars, into whose hands it fell in the 6th century. Extensive ruins of its former magnificence still exist near Mitrowitz in the Austrian Military Frontier district of Peterwardein.

SIROCCO, or SCIROCCO, a S. E. wind of a suffocating and parching heat, which at certain intervals, especially in spring and autumn, blows with great violence in the islands of the Mediterranean and on the S. coasts of Italy, for 36 or 48 hours together, and sometimes even for a week or more, and which exerts a most pernicious influence on animal and vegetable life. It is regarded as similar in character to the simoom, though of longer duration, and is probably modified by passing over the Mediterranean. It is hottest in Malta and Sicily, but of short continuance. In the Ionian isles it blows for a longer period, but usually not so fiercely. The inhabitants of these isles speak of the black and the ordinary sirocco. It produces very little change either in the thermometer or the barometer, but causes a sensation of terrible heat and suffocation, great prostration, and copious perspiration in all who are exposed to it, and its coming is heralded by a peculiar feeling of uneasiness.

SISKIN. See ABERDEVINE.

SISKIWIT. See TROUT.

SISKIYOU, a N. co. of California, bordering on Oregon and Nevada territory, and intersected by the Klamath and Shasta rivers; area, over, 3,000 sq. m.; pop. in 1860, 7,629. The surface is in part mountainous, the Sierra Nevada mountains crossing the E. and the Coast range the W. part; W. of the Coast range is a rich valley. The soil is productive. The productions in 1858 were 140,000 bushels of wheat, 122,500 of oats, and 145,000 of barley. There were 5 grist and 17 saw mills, and a distillery. Gold is found in great abundance in the neighborhood of streams. Tulare, Goose, and Klamath lakes are in the W. part. Capital, Yreka.

SISMONDI, JEAN CHARLES LÉONARD SIMONDE DE, a French historian and political economist, born in Geneva, May 9, 1773, died there, June 25, 1842. He traced his origin to an illustrious family of Pisa, who had removed to France in the 16th century, and taken refuge in Switzerland after the revocation of the

edict of Nantes in 1685. He was educated at the college of his native town; but his father having lost part of his fortune in the French stocks during Necker's ministry, the young man became a clerk in a mercantile house at Lyons. In 1793, in consequence of the troubles there and the revolutionary movements in Switzerland, the family removed to England, where for 18 months Sismondi studied English literature, trade, manufactures, and manners. Returning with his parents to the family country seat near Geneva, he and his father were subjected to persecutions for having given shelter to a political outlaw, and consequently removed to Tuscany, where he devoted himself to economical researches. In 1801 he published a *Tableau de l'agriculture Toscane*, and in 1803 a *Traité de la richesse commerciale* (2 vols. 8vo., Geneva), in which he showed himself a strong adherent of Adam Smith. As early as 1800 he had returned again to his native town, had been made secretary of the chamber of commerce of the department of Lemman, and become a French citizen. He lived now in familiar intercourse with Mme. de Staël and the eminent men who surrounded that celebrated lady, and turned his attention to history. The result of this was his *Histoire des républiques Italiennes* (16 vols. 8vo., 1807-'18; reprinted in 10 vols.). During the winter of 1811-'12 he delivered a series of public lectures, which he published under the title of *La littérature du midi de l'Europe* (4 vols. 8vo., Paris, 1813); this work has been translated by T. Roscoe, and several times reprinted both in French and English. During the Hundred Days, he was in Paris; and being convinced that Napoleon, whom he had previously opposed, was now the only man able to protect France and give her liberal institutions, he boldly advocated his cause in the *Moniteur*, but refused to be rewarded for this service. In 1819 he published his *Nouveaux principes d'économie politique, ou de la richesse dans ses rapports avec la population* (2 vols. 8vo., Paris), in which he partly recanted the principles he had formerly supported. He now devoted himself to the composition of his great *Histoire des Français*, the first volume of which appeared in 1821, and which was continued to the 29th, but left incomplete by the author's death. A continuation in 2 volumes has been added by Amédée Renée. While engaged in this vast undertaking, he wrote a historical novel, *Julia Severa, ou l'an 492*, a picture of Gaul during the 5th century (3 vols. 12mo., 1822); "The Italian Republics," an eloquent summary of his great work on the same subject, and "The Fall of the Roman Empire," both of which were originally written in English for Lardner's "Cabinet Cyclopædia" (1832 and 1835), and translated by himself into French; his *Études sur l'économie politique* (8vo., 1837); and *Études sur les constitutions des peuples libres* (3 vols. 8vo., 1836-'38). To these must be added his *Précis de l'histoire des Français*

(2 vols. 8vo.), a summary of his larger history, bringing the French annals to the death of Henry IV.; and a number of articles of various kinds which he contributed to periodicals.

**SISSOO** (*Dalbergia sissoo*), a forest tree highly prized in India for its excellent timber, suitable for ship building and various other purposes. It is found abundantly near the rivers along the foot of the Himalaya up to lat. 30° N., and grows rapidly in almost any soil. The trunk is lofty, 3 to 4 feet in diameter, and somewhat crooked. The wood is tougher and more elastic than the teak, rather light, but not remarkably durable. Its color is light grayish brown, with dark veins. It is generally selected by Europeans and natives of the N. W. provinces for purposes requiring the most strength.

**SISTERS OF CHARITY.** See **CHARITY, SISTERS OF.**

**SISTERS OF MERCY.** See **MERCY, SISTERS OF.**

**SISTERS OF MERCY, PROTESTANT**, a community of English Christian women, devoted to the work of visiting, aiding, and instructing the poor, and educating orphan and other poor children, founded at Devonport about 1845 by Miss Lydia Sellon, the daughter of an officer in the royal navy. She commenced with the establishment of industrial, infant, and ragged schools, taming and civilizing the turbulent boys of the government dockyard at Plymouth, and training the younger children, to the number of about 400, in the elementary branches of education and the first principles of religion. Very soon several ladies joined her in her work, and as the number increased they took a house and formed a community under Miss Sellon, and at first subject to the visitatorial control of the bishop of Exeter. The society, as now organized, is composed of 3 orders, viz.: those who live in community, working among the poor, and leading an active laborious life; those who, from sickness or other causes, are unable to undertake this work, but who wish to live a calm life, engaged in prayer, reading, and quiet occupations; and married and single women who live in the world, but maintain a certain connection with the community, and assist its work in various ways. The sisters are bound by no vows except a promise of obedience to their superior. They are free to abandon their vocation at will, but while connected with it adopt a peculiar garb, and share their property in common. In addition to ministration to the bodily and spiritual wants of the poor in Plymouth and Devonport, and the management of the educational institutions founded by Miss Sellon, the sisters have undertaken the entire charge and support of a large number of orphan children, whom they have taken into their own "home." In 1852, public charges having been made against the community, on the ground of its alleged Roman Catholic tendency, Miss Sellon replied to them in an able pamphlet.

**SISTERS OF THE HOLY COMMUNION**, an organization of Protestant Christian women for voluntary service as nurses in hospitals, infirmaries, &c., founded in 1845 by the exertions of the Rev. W. A. Muhlenberg, D.D., in connection with the Protestant Episcopal church of the holy communion in New York. They are bound by no vows, and though it is desirable that they should remain in their work for life, they are free to leave whenever they are so minded. They are usually received between the ages of 25 and 40 years; if under 25, the written consent of parents or guardians must be obtained. Candidates for the sisterhood are required to spend one year of probation before entering upon their vocation. They have no marked uniform, though the dress is generally black, with a white muslin collar and head dress. The sisters managed for several years the infirmary of the holy communion, and since 1858 have had charge of St. Luke's hospital, New York, under the superintendence of the Rev. Dr. Muhlenberg.

**SISTOVA**, or **SHISTAB**, a fortified town of Turkey in Europe, in the province of Bulgaria, 37 m. above Rustchuk, and 25 below Nicopoli, on a height overlooking the right bank of the Danube, which is here navigable for vessels of 500 tons; pop. about 20,000 beside the garrison. It is defended by a citadel or castle, now much dilapidated, and by a fosse and palisades. The houses are generally low and ill built; but the mosques, of which there are 8, are of considerable beauty. The town has some manufactures of leather and cotton and an active trade; and much wine is produced in the vicinity. It is regarded by the Bulgarians as their capital. A treaty of peace between Turkey and Austria was concluded here Aug. 4, 1791.

**SISYPHUS**, in Greek mythology, son of Æolus and Enarete, and married to Merope, by whom he became the father of Glaucus and others. Some later accounts make him the son of Autolycus and the father of Ulysses. To him are attributed the foundation of Corinth (Ephyra) and the establishment of the Isthmian games. Fraudulent and deceitful, he promoted the commerce of Corinth, but was punished in the lower world by being set to the task of rolling a huge marble block up hill, which as soon as it reached the top always rolled back again. The special crimes which induced this penalty are, according to different authors, that he betrayed the plans of the gods, killed travellers, and revealed the abduction of Ægina by Jupiter. It was a common tradition that Jupiter sent Death to avenge his treachery; that Sisyphus triumphed over and chained Death, who was delivered by Mars after an interval in which no one died; that Sisyphus first desired his wife not to bury him, and then in the lower world obtained permission to return and punish her for the neglect; that he refused to leave again the upper world, but was forcibly taken off by Mercury; and that this trick was the reason of his punishment.

SITKA, an island of Russian America, the largest of George III. archipelago. Its climate is humid and cold, having only on an average 66 dry days in the year. The temperature for the year averages 45.3° F., that of the summer 56.2°. The soil is generally sterile; a little barley, rye, and oats are raised.—SITKA, or New Archangel, on the W. coast of the island, in lat. 57° 3' N., long. 135° 18' W., is the only town of any size in Russian America, and the capital of the colony; pop. about 1,200. The harbor is a good one, and there is a large trade in fish and peltry with Petropavlovsk. The houses, except the governor's residence, are mere hovels. Ship building is carried on to some extent.

SIVA, the 3d deity of the Hindoo *trimurti* or trinity. He is often called by English writers on Brahminism "the destroyer," but he seems to be rather the judge and avenger, the Nemesis of the Greeks, who inflicts on men the punishment due to their evil deeds. He is usually represented as many-armed, to indicate his power to reach offenders, seated on a horse or bull, with his wife Doorga upon his knee, who bears a strong resemblance to the Astarte of the Phœnicians and the Venus of the Greeks. For a number of centuries the Hindoo worship, once mainly concentrated on Vishnu, has been directed to Siva, whose wrath the worshippers desire to avert.

SIVAS, SEEVAS, or ROTM, a pashalic of Asiatic Turkey, bounded N. by the Black sea, N. E. by the pashalic of Trebizond, E. by Erzurum, S. E. by Diarbekir, S. by Marash and Caramania, and W. by Anatolia; area, 50,000 sq. m.; pop. estimated at 800,000. The most important towns, beside the capital, are Tokat and Samsoon, the latter being the chief seaport. The surface is diversified by several mountain ranges, branches of the Anti-Taurus, between which there are extensive valleys and plains. The Euphrates flows on the S. E. boundary, but the greater part of the drainage is carried to the Black sea by the rivers Kizil-Irmak, the Halys of the ancients, on the W. boundary, Yeshil-Irmak, and several smaller streams. The most valuable minerals are iron, copper, lead, alabaster, marble, slate, and salt, the last named being particularly abundant. A great deal of the soil is exceedingly fertile, but not very thoroughly cultivated. The pastures are very extensive, and many tracts well adapted for agriculture are occupied by the herds of the Koords and Toorkomans. In ancient times the province formed parts of Pontus and Cappadocia.—SIVAS (anc. *Sebastia*), the capital, is situated in an extensive plain on a tributary of the Kizil-Irmak, 410 m. E. S. E. from Constantinople, and 60 m. S. from Tokat; pop. about 27,000. The town is defended by two old castles, and contains numerous mosques, many of which are elegantly ornamented in the best style of Arabian or Persian architecture. There are many baths and khans, and the bazaars are well supplied. The manufactures are of little im-

portance, but a considerable trade is carried on. Mithridates was defeated by Lucullus in the neighborhood of Sebastia; and toward the close of the 14th century several battles were fought here between Bajazet and Tamerlane; the former was defeated and the town ruined.

SIVATHERIUM, a genus of extinct ruminants, placed by Pictet and most palæontologists nearest the giraffe. The head and a considerable part of the skeleton have been found in the tertiary formations of the Sivalik hills of the Himalaya range. The head in size approaches that of the elephant, and must have been supported on a much shorter and stronger neck than that of the giraffe; the part behind the orbits was much developed, the face short, and the nasal bones arched. Above and between the eyes were 2 diverging horns, and probably 2 other shorter and massive ones in the usual situation; the molars of the upper jaw were 6 in number on each side, having all the characters of those of ruminants. It was certainly a ruminant, with pachyderm affinities in its robust form, short neck, and probable presence of a proboscis (as indicated by the nasal bones). The only species described, *S. giganteum* (Cautl. and Falc.), was as bulky as and higher than the elephant; in the teeth, the fore limbs, and the hoofs, it resembles the moose (*alce*) more nearly than any typical ruminant; it would seem one of the connecting links between the giraffe and the *cervide* or deer family, the proboscis being intermediate between the trunk of the tapir and the long and flexible snout of the moose. De Blainville places it among the antelopes. *Bramatherium* (Falc.) is an allied genus, known only by fragments of jaws from the island of Perim in the gulf of Cambay; the only described species is the *B. Perimense* (Falc.). Casts of the skull and anterior limbs of the *sivatherium* are in the cabinet of the Boston society of natural history.

SIWAH (anc. *Ammon* or *Ammonium*), an oasis in the N. W. of Egypt, near the boundary of the disputed territory between Egypt and Tripoli, in lat. 29° 12' N., long. 26° 17' E., and about 160 m. from the coast of the Mediterranean sea. The whole oasis is about 15 m. long and 12 broad. Its surface is undulating, and surrounded on the N. by high limestone hills. There are numerous salines or salt ponds and springs, and also an abundance of springs of fresh water. The soil is exceedingly fertile, yielding largely of grain, olives, oranges, dates, and other fruits, and furnishing excellent pasturage. The climate is delightful. The inhabitants are Berbers and negroes, and all zealous Mohammedans. The principal town, Siwah, is curiously built under cover like a huge beehive, and is wretchedly dark and dirty; pop. about 8,000.—The early Greek geographers and travellers speak of 3 remarkable objects to be found in this oasis, viz.: the well of the sun, which was warm in the morning and evening, and cold at noon; the palace of the ancient Ammonian kings, surrounded by a

triple wall; and the temple and oracle of Jupiter Ammon, surrounded by a shady grove, the ruins of which are still visible. The hieroglyphics, paintings, and sculptures on the ancient walls have been described and copied by Minutoli. The oracle was one of great reputation in early times, but in the time of Strabo was entirely neglected. Alexander the Great visited the temple. The fountain of the sun still exists, and has still a varying temperature. There are also extensive catacombs cut in the rocks in different parts of the oasis.

**SIX NATIONS.** See IROQUOIS.

**SIX PRINCIPLE BAPTISTS**, a small religious sect which originated in Rhode Island in 1665. Their church polity and views on baptism are the same as those of the Baptists. In doctrine they are Arminian. They oppose the payment of any regular salary to their preachers, and have never connected themselves with any missionary efforts, or temperance or other benevolent or reformatory societies. They hold as their distinguishing doctrines the 6 principles laid down in Heb. vi. 1-3, viz.: repentance from dead works; faith toward God; the doctrine of baptisms, by which they understand John's baptism, the baptism of the Holy Ghost, the baptism of Christ's sufferings, and apostolic or Christian baptism; laying on of hands, which they regard as equally necessary with baptism; the resurrection of the dead; and eternal judgment. They have 18 or 20 churches, in Rhode Island, Massachusetts, New York, and Pennsylvania, 16 ordained ministers, and about 3,000 members.

**SIXTUS**, the name of 5 popes, of whom the following are the most important: I. **SIXTUS IV.** (FRANCESCO ROVERE), born at Celles near Savona in 1413, died Aug. 13, 1484. He was a member of the Franciscan order, and considered the most distinguished Italian preacher of his times. He succeeded Paul II. in 1471, and made at once great preparations for convoking an oecumenical council, for terminating the wars of the Christian princes, and for continuing the war against the Turks. He entirely failed in the first and second of these attempts; and the war against the Turks, though the pope in concert with Venice and Naples sent a fleet to Asia Minor which took Smyrna, had no permanent result. He made himself odious by excessive nepotism, by imposing heavy taxes on his subjects, and by an eager participation in the civil wars of Italy. He is, in particular, accused of having been involved in the conspiracy of the Pazzi in Florence against the Medici (1478). In a bull on the immaculate conception, he forbade any further controversy on the subject; he also confirmed the Spanish inquisition. II. **SIXTUS V.** (FELICE PERETTI), born near Montalto in 1521, died Aug. 27, 1590. He was in his early youth a herdsman, entered the Franciscan order in 1534, and distinguished himself as a lecturer on the ecclesiastical law at Rimini in 1544 and Sienna in 1546, as a popular preacher,

and as an author by works on mystical theology, and on the philosophy of Aristotle. In 1557 he became inquisitor-general at Venice, and in 1570 he was created cardinal, when he assumed the name Montalto. After the death of Gregory XIII. in 1585, he was elected pope by an almost unanimous vote. Both as pope and as secular prince he was distinguished for prudence, severity, and energy. He destroyed the power of the banditti and restored order and safety throughout his territory, administered law with the utmost impartiality and with an almost barbarous severity, built a great aqueduct, enlarged the library of the Vatican, and in many other ways encouraged industry. He fixed the number of cardinals at 70, required the Catholic bishops of all countries to visit Rome at certain intervals, and reorganized the entire administration of ecclesiastical affairs by the appointment of 15 congregations of cardinals and other officers. He founded a new university at Fermo, and new colleges at Rome and Bologna. From the printing press of the Vatican he published the revised edition of the Vulgate, which had been ordered by the council of Trent. He was a great statesman, and avoided war with the Christian princes as much as possible, though he encouraged and supported Henry III. against the Huguenots, Philip II. against England, and Archduke Maximilian when he was a candidate for the crown of Poland. He hurled his anathemas against the young king of Navarre, who had left the Catholic church, and against Elizabeth of England for having put to death Mary Stuart. He summoned Henry III. to Rome for having ordered the assassination of the duke of Guise, and threatened him with excommunication if he should refuse to release the cardinal de Bourbon and the archbishop of Lyons. He left behind him a vast treasure in the castle of St. Angelo, to be used by his successors only in circumstances strictly defined. He was not loved by the people, but feared and admired, and his history soon became a prolific source of popular anecdotes and legends. His biography by Leti (*Vita di Sisto V.*, Lamsanne, 1669) is strongly objected to by Catholic writers as untrustworthy; that by Tempesti (*Storia della vita e geste di Sisto V.*, Rome, 1755) has too much the character of a partisan eulogy.

**SIZAR**, a term used in the university of Cambridge, England, and at Trinity college, Dublin, to denote a class of students who are pecuniarily assisted through the benefactions of founders or other charitable persons. They correspond with the so called servitors of Oxford, and like them were formerly required to perform certain menial duties, which latterly have been much restricted if not entirely abolished. The name is supposed to be derived from the term size, which in college phraseology denotes an allowance of provisions at the college buttery.

**SIZE**, a kind of glue prepared from the clippings of parchment and thin skins, and used

chiefly for giving a finished surface to cotton goods, paper, &c.

**SJÖBERG, ERIK**, a Swedish lyric poet, better known under his pseudonym of Vitalis, born in Ljungo, Sudermania, Jan. 14, 1794, died in Stockholm, March 4, 1828. He was the son of a laboring man, and was enabled by the assistance of his friends to receive his education at the university of Upsal. He first brought himself into notice in 1819, and thenceforth held a high position among contemporary Swedish poets. In 1824 he settled in Stockholm, but died of consumption, in great poverty. His poems, the best of which are written in a satirical vein, were first published in a collected form in 1828, a few months after his death. He also published some translations from Washington Irving.

**SJÖGREN, ANDREW JOHN**, a Finnish philologist, born in the parish of Ithi, May 8, 1794. He was educated at the university of Abo, and has passed the greater part of his life in Russia. He has published a treatise in German "On the Finnish Language and Literature" (St. Petersburg, 1821), "Notes on the Parishes in Kemi-Lappmark" (Helsingfors, 1828), in Swedish, and numerous philological and ethnographical papers. During a residence of several years in the Caucasus he mastered the languages of that region, and in 1844 published his "Ossetic Grammar and Vocabulary," in German (4to.).

**SKAGER RACK** ("the crooked strait of Skagen"), an arm of the North sea or German ocean, lying between the Danish peninsula of Jutland and the coast of Norway, and connecting the Cattegat with the North sea. Its course is from E. N. E. to W. S. W.; length about 150 m., breadth nearly 80 m. It is much deeper on the Norwegian than on the Danish coast, ranging on the former from 150 to 200 fathoms, near the centre from 60 to 100, and near the coast of Jutland from 30 to 40. It is subject to severe storms. In fair weather the current flows E. on the Jutland side and W. on the Norwegian. The harbors are all on the Norwegian coast.

**SKALDS.** See **SCALDS**.

**SKAMANIA**, a S. co. of Washington territory, bordering on Oregon, bounded S. by Columbia river and N. by the Yakima, and drained by the Wenass, Naches, Atahnam, and Pisco rivers; area, 1,500 sq. m.; pop. in 1860, 225. The surface is generally mountainous, with fertile valleys along the streams. The Cascade mountains traverse the county from N. to S., the highest peaks of which are Mt. Adams in the centre of the county and Mt. Rainier in the north. Capital, Cascade City.

**SKATE.** See **RAY**.

**SKATE** (Dutch, *schaat*), a sort of shoe with a steel runner, used one under each foot for sliding or travelling over the ice. With the name the article has been transmitted to us from Holland, upon the canals and rivers of which skates have from an unknown period

been used by all classes of people for the sake of the easier and more rapid progress made by their aid. In other cold countries skating is practised rather as an amusement and healthful exercise. It was known in ancient times, and mention is made of it in the Edda, in which the god Uller is represented as distinguished by his beauty, arrows, and skates. The Icelanders in former times used for skates "the shank bone of a deer or sheep about a foot long, which they greased because they should not be stopped by drops of water upon them." In the description of the ancient customs of London by Fitzstephen it is remarked: "Some tye bones to their feet and under their heeles, and shoving themselves by a little picked staffe doe slide as swiftly as a bird flyeth in the air, or an arrow out of a crosse bow." In Edinburgh as well as London skating was a highly popular amusement several centuries ago. Strutt, in "Sports and Pastimes of the People of England," remarks that he has seen upon the Serpentine river 4 gentlemen dance a double minuet in skates with as much ease and more elegance than in a ball room. William Hone also, in the "Every Day Book," remarks that "the elegance of skaters on that sheet of water is chiefly exhibited in quadrilles, which some parties go through with a beauty scarcely imaginable by those who have not seen graceful skating." In countries where snow abounds skating cannot be practised to the extent that it is in those bordering upon the North sea; and in the United States, probably for this reason, the amusement has not been so general or carried to so great perfection as in the N. W. countries of Europe. It has, however, within the past few years become a fashionable exercise, not only for young men but also for young ladies. The practice has received a great stimulus by the construction of ponds specially adapted to it in the central park of New York, which are carefully kept free from snow. The effect of this increased attention to the art is seen in the variety of forms of skates recently introduced, and the entire disappearance of the few ordinary forms heretofore in common use. These were in general blocks of wood with the upper surface flat and shaped like the foot, and having under the bottom a slip of iron fixed edgewise in a longitudinal groove, and well secured at the toe by a sort of hook returning back into the wood, and at the heel by a screw. The front end of the iron turned up in a graceful curve, and the bottom, which was generally from  $\frac{1}{4}$  to  $\frac{1}{2}$  of an inch thick, was commonly grooved, but sometimes left smooth with sharp edges. They were fastened to the feet by straps passing over the instep and crossing each other from the toe to the heel. Steel was soon substituted for iron runners, and a great variety of devices were adopted for more securely attaching the skates to the foot. In one form a sort of windlass is very neatly introduced into the wooden stock, by the turning of which with a key any desired strain can

be brought upon the fastenings. In another form the stock was dispensed with, and the skate runner was secured directly to the bottom of the boot; in another the stock is a flat sole of iron; in another India rubber springs are introduced into the wooden stock to impart elasticity. Skates again have been divided into a front and back piece, which are connected by a spring, and the runner being made elastic, the back portion keeps snug up to the heel when the weight of the body is thrown forward. An excellent contrivance for securing a choice of runners, grooved or smooth, with the same pair of skates, and these very light, consists in making the runner of a slip of steel about  $\frac{1}{4}$  inch thick, and so narrow as to have considerable spring. This, double the length required for the skate, is bent over in a curve and back upon itself in the shape of a long letter U. This is tightly fitted in two little brass standards under the stock with the curved end forward, and may at any time be slid out and turned over to bring the other limb upon the ice. Ladies' skates are made with shoes fitted to the foot.—Skates were in use in Paris as early as 1819 that were made to run upon the ground, being furnished, instead of a runner, with 3 little brass wheels. It is said they were often seen on the boulevards and in the public gardens, the skaters moving with great rapidity up and down the long smooth avenues. They were introduced upon the French stage by the dancer Dumas and his wife; and the opera of the *Prophète* included a ballet of skaters which attracted much admiration. These skates evidently suggested those called parlor skates, in which the wheels are made of India rubber, occasionally worn by children in the streets as well as in houses.

**SKELETON** (Gr. σκελλω, to dry), the osseous framework of vertebrated animals, arranged in its natural connections. Its general characters, the relations and homologies of the different parts, the laws of unity in variety, and the reduction of all its forms to an archetype, have been given in the articles *BOXE*, *COMPARATIVE ANATOMY*, and *PHILOSOPHICAL ANATOMY*. The bones serve as levers for the action of muscles, and as cavities to enclose or a framework to protect the organs essential to life; they are united by ligaments and cartilages, moved by muscles, and strengthened by tendons and fasciæ. In the human skeleton there are in the cranium the frontal bone forming the forehead, the parietals on the top and sides, the occipital behind, the temporals in the region of the ears, the sphenoid at the base, and the ethmoid between the orbits—8 in all, to which may be added the 8 bones of the ears. In the face are the 2 upper jaw bones, the nasals covering over the nose, the malars forming the prominences of the cheeks, the lachrymals at the inner angle of the orbits, the palate bones, the inferior turbinated, the vomer making the partition between the nostrils, and the lower jaw, to which may be

added 32 teeth, making in all 46. The vertebræ proper are 24, 7 in the neck, 12 in the back, and 5 in the loins; in the chest are 12 ribs on each side and the breast bone in front; the hyoid bone in the neck makes, with the preceding, 50 bones in the trunk. In each upper extremity are the shoulder blade behind and the collar bone in front, the arm bone, 2 bones in the forearm, 8 in the wrist in 2 rows, 5 metacarpals, and 14 finger bones—in both limbs, 64. To the lower extremity belong the hip bones, the sacrum and coccyx behind; and to each limb a thigh bone, 2 bones in the leg, 7 in the ankle, 5 in the metatarsus, and 14 in the toes—in both limbs, 62. If the 2 knee pans be added, which are properly sesamoid bones in the tendon of the extensor of the leg, the whole number of bones in the human skeleton, including the teeth, is 240. (For the development of bone in the fœtus, see *EMBRYOLOGY*.) The skeleton in the female is smaller and more delicate than in man, and the bony processes less strongly marked; the lower limbs are proportionally longer, making the middle of the length of the body below instead of on a level with the pubis; the head is more elongated, and narrower in front; the vertebræ are less wide, the lumbar region longer, the chest shorter and less prominent (when undeformed by corsets), the shoulders lower and less widely separated, the arms shorter, the thigh bones more curved anteriorly and more obliquely placed, and the feet and hands smaller; all the diameters of the pelvis are larger, the articulations less firmly united, the iliac edge more flaring, and the pubic arch more open. The skeleton, properly articulated artificially, represents the height of the individual in life by adding 1 $\frac{1}{2}$  to 2 inches for the soft parts. The proportion of the bones to each other is so exact, that the height of an individual may be determined by the measurement of one or two of the long bones.

**SKELTON**, JOHN, an English poet, born probably in Norfolk about 1460, died in Westminster, June 21, 1529. He was graduated at Cambridge probably in 1484, was created a poet laureate (which was then a degree in grammar) by the university of Oxford, entered holy orders in 1498, and became afterward *ad eundem* student at Cambridge. He was tutor to the duke of York, afterward Henry VIII.; was rector of Diss and curate of Trompington in 1504; was appointed *orator regius* to Henry VIII.; and in an epistle dedicated to him by Erasmus was declared the *lumen et decus* of British letters. According to Anthony à Wood he was esteemed "fitter for the stage than for the pen or pulpit." Being secretly married, he concealed the fact, was accused of keeping a concubine, and was suspended by the bishop of Norwich. The clergy were the special object of his satire; and, having drawn upon himself the resentment of Wolsey by a severe attack, he took sanctuary at Westminster, under the protection of his old friend Abbot Islip, where he resided till his



death. From the almost total want of the first editions of his poems, it is impossible to ascertain their dates. The best of them are humorous or satirical, in short rhyming verses, and show a remarkable command of droll phraseology. His indelicacy and volubility make him comparable to Rabelais. He wrote the dramas (moralities) of "Magnyfycence" and "The Bowge of Court," an effective satire on Wolsey entitled "Why come ye nat to Courte?" the "Boke of Colin Clout," and a dirge on "Phyllyp Sparowe," pronounced by Hallam his most "comic and imaginative" production, and by Coleridge "an exquisite and original poem." The best edition of his works is by the Rev. Alexander Dyce, with an account of his life (2 vols., London, 1843).

**SKERRYVORE.** See LIGHTHOUSE, vol. x. p. 523.

**SKIDDAW**, a mountain near the centre of Cumberlandshire, England, 3,022 feet in height. It has the lake of Bassenthwaite Water on its W.; and though there are some mountains in the same county of greater elevation, yet as Skiddaw stands in a manner isolated and is seen at one view from the base to the summit, its appearance is more imposing.

**SKIMMER** (*rhynchops*, Linn.), a genus of web-footed birds of the gull family, and subfamily *rhynchopsinae*. The bill is of a very singular shape, broad at the base, from which it is suddenly compressed laterally to the end; the upper mandible is considerably the shorter, curving gradually to the tip, which is pointed and grooved underneath; the lower mandible is straight and truncated, more compressed, with a sharp cutting edge received into the groove of the upper; nostrils basal; wings very long and narrow, with the first quill the longest; tail moderate and forked; tarsi longer than middle toe; feet very small, toes short with indented web, hind toe elevated, and claws curved and sharp. There are 3 or 4 species described, found most abundantly in the tropics, where they frequent quiet bays and inlets connected with the ocean; they feed chiefly at night on fish and crustaceans, which they catch as they skim along close to the water, dipping the under mandible beneath the surface and closing the upper suddenly upon it when their prey is encountered; the flight is swift, graceful, and undulating, and the gait awkward; though having webbed feet, they rarely if ever swim or rest upon the water. The best known species is the black skimmer (*R. nigra*, Linn.), found on the Atlantic and gulf coasts of North America from New Jersey to Texas, on the E. coast of South America as far as Paraguay, and, according to Lesson, on the W. coast. The length is about 19 inches, and the alar extent 48; the general color above is deep brownish black; the front to the eyes, throat, and under parts white; inner tips of 4 inner primaries white, and secondaries broadly tipped with the same; the central tail feathers dark brown, the others

mostly white; the bill carmine for the basal half, thence black to the end, the upper mandible about  $3\frac{1}{2}$  inches and the lower  $4\frac{1}{2}$ ; tarsi and feet red, and iris hazel; the female is smaller. They are nocturnal in habit, resting by day on the sand bars; they live in large flocks, which as they rest upon the sand present the appearance of a black pall; during flight they look like a silvery or black cloud, as they show the under or upper surface in their evolutions; they are shy and hard to approach; while feeding they utter hoarse cries, and they boldly chase off crows and turkey buzzards from their breeding grounds. The nest is a slight hollow in the sand, and the eggs are usually 3,  $1\frac{1}{2}$  by  $1\frac{1}{8}$  inches, white with large black or dark patches; the female sits only at night or in wet and cold weather; the young closely resemble in color the sand upon which the nest is made; they migrate to the south when the young are able to fly; their eggs are as good as those of the gulls. This species is sometimes called razor-billed shearwater. According to Lesson, a species on the coast of Chili, which he considers a variety of the *R. nigra*, introduces its bill between the shells of open bivalves (*maetra*), breaks them and feeds on the animal within. Other species are found on the W. coast of Africa.

**SKIN**, the external covering of the animal body, protecting the internal parts from external violence, and adapting itself by its elasticity to the various movements and changes of position; it also acts as the organ of touch, and as an excretory and absorbing surface. In the human skin, which may be taken as the type of that of the higher animals, the deepest portion is the *corium*, *dermis*, or *cutis vera*, as distinguished from the deciduous cuticle which overlies it, described under EPIDERMIS. This true skin is dense and tough, highly elastic, composed of fibres interlaced in all directions, in whose interstices are masses of fat; the whole layer rests upon a structure of adipose and areolar tissue; within and below it are the sudoriparous or sweat glands (see PERSPIRATION), the hair follicles (see HAIR), and the sebaceous glands. From its upper surface rise the sensitive papillæ, which are minute conical elevations, most numerous on the palmar surface of the hands and fingers, feet and toes, where they are arranged in double rows in parallel curved lines; the average length of the papillæ is about  $\frac{1}{16}$  of an inch, and the diameter at the base  $\frac{1}{32}$ ; they are abundantly supplied with blood, which explains their erectile turgescence under stimuli; they adhere more or less firmly to the cuticle. The sebaceous or oil glands of the skin are formed on the same plan as the sudoriparous, and can often be distinguished from them only by the nature of their oily secreted product; they are distributed over the whole surface of the body, being least abundant where the perspiratory glandulæ are the most numerous, and *vice versa*; they are absent on the palms and soles, but abundant

on the face and scalp; they vary considerably in size, but the tubes are generally wider and straighter than those of the sweat glands; the structure is sometimes complicated. In the parts of the skin covered with hair, there is usually a pair of sebaceous ducts opening into the follicle of the hair. The object of their secretion is doubtless to prevent drying and cracking of the skin by the sun and air; this secretion is most abundant in tropical nations, and in some dark races has a characteristic odor, as in the case of the negro; its protective action in the tropics is often assisted by vegetable oils applied externally. These follicles are infested by an arachnid parasite (*demodex folliculorum*), most common in the inhabitants of large towns, whose skins are rendered inactive by sedentary habits and want of free exposure to air, or are unnaturally stimulated by gross food. The Meibomian glands on the edges of the lids are a double row of sebaceous follicles set along a straight duct; they secrete an oily matter for the lubrication of these parts, which in diseased conditions frequently sticks them together. Another modification of sebaceous glands is to be found in the external ear passage, where is secreted the *cerumen* or waxy matter; they consist here of long, highly contorted tubes, well supplied with blood vessels. The color of the skin depends on pigment cells mixed with the inferior epidermic ones, in what is called the *rete mucosum*, or mucous layer, and considered by Flourens and other authors as a distinct membrane; all the hues of the races of man depend on the relative abundance of these cells and the tint of the contained pigment. The folds of the skin are for the most part produced by the contractions of the superficial muscles; in some animals the *platysma myoides*, existing in a rudimentary condition on the face and sides of the neck in man, produces many and complicated movements in the skin. The skin is pierced at the eyes, ears, nostrils, mouth, rectum, and genito-urinary opening, and is there furnished with hairs; it is continuous internally with the mucous membrane, consisting of the same elements modified according to the variety of functions to be performed; it is very vascular, and freely supplied with nerves and lymphatics. The skin is the seat of the sense of touch in man, though in most other animals hairs, scales, bony or horny plates and envelopes, and shells, render it nearly insensible to external influences, this sense in them being confined to particular portions or projecting organs; even in man the sensibility varies much in different parts, being most acute at the ends of the fingers and on the lips, and duldest on the back and limbs; the papillæ enclose loops of capillaries and filaments of sensory nerves; these last terminate in loops returning into each other, and, according to Gerber, surrounded by a small quantity of vesicular matter. The impression must be made by actual contact with the sensory surface. In regard to sensations of heat and cold, the prox-

imity of the body is sufficient, the impression acting through the air; it is interesting to note that the mechanical irritation of common sensory nerves does not excite sensations of heat and cold; some physiologists think there are special filaments for sensations of heat and cold, coming from the ordinary sensitive cerebral and posterior ganglionic portions of the spinal nerves. Aëration of the blood takes place to a certain extent through the skin, and in some naked-skinned fishes and batrachians this is a very important part of the respiratory process. It has been shown by experiment that in a frog, after the removal of the lungs,  $\frac{1}{4}$  of a cubic inch of carbonic acid is exhaled from the skin in 8 hours; in the human subject the amount of this gas given off by the skin varies from  $\frac{1}{16}$  to  $\frac{1}{8}$  of that exhaled from the lungs during the same time; where the lungs perform their office imperfectly, the temperature of the skin is often elevated; in all febrile diseases the skin should be kept moist, which gives great relief by promoting cutaneous respiration. The skin is subject to many eruptive diseases, vesicular, pustular, scaly, tubercular, &c., affecting all the layers from the cuticle to the subcutaneous areolar tissue. Leather is the product of the chemical action of tannin and other astringents, vegetable or mineral, on the fibrous portion of the corium; most mammalian skins are used in this way, and even the human skin has been made into leather. The absorbent powers of the skin are noticed under ABSORPTION.

SKINK, the common name of the *scincidae*, a family of lepidosaurian, slender-tongued lizards, with elongated cylindrical body, covered above and below by imbricated fish-like scales, arranged in quincunx and held in membranous sacs; they have no lateral folds. The family, by such forms as the seps and orvet, constitutes a connecting link between the saurians and ophidians. The head is covered with large angular plates, joined by their borders; the neck is of the same size as the chest; the tongue free, without sheath, slightly notched in front, with the surface mostly covered with papillæ; the scales are smooth. They creep with a lateral sinuous motion like serpents, and are able to insinuate themselves into small openings; they have no crests nor fringes on the neck, back, sides, or tail, the last being conical, and generally long and without spines; the feet are short and clumsy, with well developed digits and claws, but in some are absent. The jaws are short and united at the symphysis, so that the opening of the mouth is always the same; the teeth are sharp and slender, suited for seizing the insects and worms on which they chiefly feed; in the snake-like forms only one lung is largely developed; the ears are exposed. They are generally of small size, and live in holes and under stones in dry sandy places; they are usually of an earthy gray color, resembling the ground upon which they are found, palest below, and sometimes variegated. They inhabit the torrid zone and the driest portions of tem-

perate regions; some, like the *anguis fragilis* (blind worm), are found as far N. as Sweden in Europe; they are most abundant in the Pacific islands and in Australia. Duméril makes 3 great divisions according to the differences in the covering of the eyes: 1, *saurophthalmes*, with lizard-like eyes, protected by 2 lids moving vertically; 2, *ophiophthalmes*, with a rudimentary lid, as in serpents; and 3, *typhlophthalmes*, in which the eyes are concealed under the skin. Most of the more than 80 genera, comprising more than 100 species, belong to the first division, the only one that need be treated here; some of them have 4 limbs, others 2, others none.—In the genus *scincus* (Fitz.) the snout is wedge-shaped, the upper jaw the longer, the teeth simple, conical, and obtuse, with a row on the palate; the limbs are 4, with 5 nearly equal digits, flattened, and with serrated borders; the tail is conical and pointed. The common skink (*S. officinalis*, Laur.) is 8 or 9 inches long, with stout body, short thick limbs, and a proportionally short tail very thick at the base; the eyes are small, high up and far back. The colors vary considerably, from silvery yellow to brownish, with 7 or 8 black transverse bands. It is a native of Egypt, Nubia, Arabia, and N. and W. Africa, where it is seen in sandy places, running with considerable swiftness, when pursued burying itself quickly in the sand by means of its pointed muzzle. The Arabians and other orientals attribute to it extraordinary medicinal virtues, especially as an aphrodisiac; it was dried and salted, and sold generally by apothecaries; it is now little used, even in the East.—There are several American species of this family, most of which are popularly called “galliwasp,” one of the best known of which belongs to the genus *diploglossus* (Wieg.), characterized by a tongue with scaly papillae in front and filiform behind, toothless palate, flat head, obtuse muzzle, and flattened body; the feet have 5 unequal toes, compressed, without lateral edgings, and with tuberculose palms and soles; the scales are striated, and ridged in the middle; the tail is rounded, long, and pointed, with a very large anal operculum. The great galliwasp (*D. occiduus*, Wieg.) is about 21 inches long, of which the tail is one half; it is one of the largest of the skinks. The color above is generally light brown, with a dozen or more transverse bands, sometimes darker and sometimes lighter, and yellowish white below with brownish tints. It is found in the island of Jamaica, where it is very much dreaded, though it is perfectly harmless; it forms the type of Gray’s genus *celestus*.—The five-lined skink (*euprepes quinquelineatus*, Wagl.) is 10 to 11 inches long, the head pale red with 6 obscure white lines, the 2 internal confluent at the back part; the body above is olive brown with 5 pale white longitudinal lines and a black lateral band; the tail brown, tinged with blue, and the lower surface white. There are no teeth on the palate, otherwise

the characters are as in the last genus. It lives in the stumps of old trees in thick woods, not far from the ground, and is found from lat. 35° to the gulf of Mexico and west to the Mississippi river. The blue-tailed skink (*E. fasciatus*, Wagl.) very much resembles the last named, and is by many considered a mere variety, but Holbrook regards it as distinct on account of the colors, habitat, and tail plates.—In the genus *lygosoma* (Gray) the nostrils open in the single nasal plate, the palate is without teeth, and the scales are smooth. The ground skink (*L. lateralis*, Say) is 5 inches long, of which the tail is 3; the head is short, with rounded muzzle; the body, limbs, and tail above are chestnut or bronzed, the throat silver white, the abdomen yellow, the tail below bluish mottled with gray, and a broad black band extends from the head nearly to the end of the tail. It is found from North Carolina to the gulf of Mexico, and west to the Mississippi; it is very numerous in the thick oak and hickory forests of the Carolinas and Georgia, coming abroad after sunset; from its small size and lively movements it might easily be mistaken for a cricket; it is very difficult to capture.—Though the common skink is sometimes found in S. Europe, the best known member of the family there is the ocellated skink (*gongylus ocellatus*, Wagl.); in this genus there are no teeth on the palate, which has a longitudinal groove, and the scales are smooth; the limbs are short, and the lower lid has a transparent disk; the body is thick and clumsy, the muzzle rounded, the eyes small, the gape large, and the teeth small, uniform, close together, and 22 to 26 above and below. It is about 10 inches long, of which the tail is nearly one half; the colors vary exceedingly, the most common being brownish with black spots having a white or yellowish centre, and sometimes united into transverse zigzag bands. It is found all along the N. shore of the Mediterranean, in Sardinia, Sicily, Malta, and Cyprus, also in Egypt and on the island of Teneriffe, and probably in S. France; it lives in dry places, concealing itself in the sand or under stones, and moving with considerable activity; it has been described by various authors under the name of *tiliqua*.

SKINNER, EZEKIEL, M.D., an American clergyman and physician, born at Glastenbury, Conn., June 27, 1777, died at Greenport, L. I., Dec. 25, 1855. In his youth he was apprenticed to a blacksmith, but at the age of 20 abandoned the trade, studied medicine, and commenced practice in Granville, Mass., in 1801. He soon afterward renounced deism, which he had previously been active in propagating, and united with the Congregational church; and in 1807, having removed to Lebanon, Conn., he connected himself with the Baptist church. He served in the war of 1812, first as a subaltern, and afterward as surgeon. In 1819 he was licensed to preach at Stafford, Conn., and in 1822 was ordained as pastor of

the Baptist church in Ashford. His son, the Rev. Benjamin Rush Skinner, had gone in 1830 as a missionary to Liberia; but within less than a year he and his wife and child fell victims to the climate, and Dr. Skinner, though 57 years old, resolved to go to Liberia to fill his place. He sailed in 1834, and as medical chief of the colony, as its governor, and as a preacher, spent 4 years there, visiting the United States once in that period. After his return he resumed his pastoral duties and his medical practice. Dr. Skinner's only publication was a series of essays on the prophecies in the "Christian Secretary" (1842).

SKINNER, JOHN, a Scottish clergyman and poet, born at Balfour, in the county of Aberdeen, Oct. 3, 1721, died in Aberdeen, June 16, 1807. He was educated at the Marischal college, Aberdeen, at the age of 21 was ordained a presbyter of the Episcopal church, and immediately afterward was settled over a congregation at Longside in Aberdeenshire, with which he remained connected for 65 years. During the early part of his ministry he suffered many persecutions on account of the Jacobite sympathies which it was supposed he entertained in common with most Episcopalians in Scotland, and his whole life was a struggle with poverty. He was an accomplished Latin and Hebrew scholar, but is best known at the present day by a number of popular songs, one of which, "Tullochgorum," was said by Burns to be "the best Scotch song Scotland ever saw." An edition of his songs and poems, with a life of the author by H. G. Reid, was published in 1859. His principal prose works are a "Dissertation on Jacob's Prophecy" (1757), and an "Ecclesiastical History of Scotland," &c. (2 vols. 8vo., London, 1788).

SKINNER, JOHN STUART, an American editor and agricultural writer, born in Maryland, Feb. 22, 1788, died in Baltimore, March 21, 1851. He studied law, and was admitted to the bar at the age of 21. In 1812 he was appointed by President Madison to conduct some negotiations with the British forces in Chesapeake bay, removed to Baltimore in 1813, and was for 22 years postmaster of that city. Having a taste for agriculture, and a desire to promote the development of our national agricultural resources, he commenced in 1819 the publication of the "American Farmer," the first periodical devoted solely to agriculture in the United States. After conducting it for several years, he sold the establishment for \$20,000. He afterward originated the "Turf Register," which he edited for a number of years. He was the first to propose and organize agricultural shows in the middle and southern states. In 1841 he was appointed second assistant postmaster-general, and held the office till 1845. He then became the editor of the "Farmer's Library and Agricultural Journal," at New York, which he relinquished after a few months, and established a monthly journal called the "Plough, Loom, and Anvil."

SKINNER, RICHARD, an American statesman and jurist, born in Litchfield, Conn., May 30, 1778, died in Manchester, Vt., May 23, 1833. He received his professional education at the celebrated law school in his native place, was admitted to the bar in 1800, and emigrated the same year to Manchester, Vt. Achieving at once a high standing in his profession, he was appointed state's attorney the next year, when only 23 years of age. In 1809 he was appointed judge of probate, and in 1812 he was elected a representative in congress. In 1816 he was appointed an associate justice of the supreme court of Vermont, and in 1817 was elected chief justice of the state. Declining a reappointment the next year, he resumed the practice of his profession, and in the autumn of 1818 became member of the state legislature, and was elected speaker of the house of representatives. In 1820 he was elected governor of the state, and reelected in 1821 and 1822. Declining a reelection in 1823, he was immediately appointed chief justice of the state, and held that position until 1829, when his failing health obliged him to retire from public life. Henceforth he devoted himself to the great charitable and educational enterprises of the day.

SKINNER, THOMAS HARVEY, D.D. an American clergyman, born at Harvey's Neck, N. C., March 7, 1791. He was graduated at Princeton college in 1809, and commenced the study of law; but having decided to enter the ministry, he was licensed to preach in Dec. 1812, and ordained in June, 1813, as co-pastor of the 2d Presbyterian church in Philadelphia. Mr. Skinner's opinions coinciding more fully with what afterward became the New than with the Old School of the Presbyterian church, he changed his pastoral relation after about 3 years to the 5th Presbyterian church in Philadelphia. Here he remained till 1832, when he accepted a call to the professorship of sacred rhetoric in Andover theological seminary. In 1835 he became pastor of the Mercer street Presbyterian church, New York, and in 1848 professor of sacred rhetoric and pastoral theology in the Union theological seminary there, which position he still holds (1861). In 1836 he published 3 small volumes, "The Religion of the Bible," "Preaching and Hearing," and "Hints to Christians," and in 1854 translations of Vinet's "Homiletics" and "Pastoral Theology." He has also published occasional discourses.

SKIPJACK. See BLUEFISH, and BOXIT.

SKOVORODA, a writer of Little Russia, known there as GREGORY SAVITCH, born in a village near Kiev about 1730, died in 1778. He studied at the ecclesiastical seminary of Kiev, at Pesh, and at the university of Halle, where he pursued for 8 years metaphysical and theological studies, translated into his native tongue some of the homilies of Chrysostom, and composed moral fables, which have been handed down orally by the inhabitants of the Ukraine. Having returned to the Ukraine, he zealously endeavored to check the persecu-

tions to which the United Greeks were exposed, and to gain them over to the national church by persuasion. He was in consequence ejected from his cure, visited Rome, and again returned to his native country, continuing his exertions against religious persecution, but was accused as a rebel, and obliged to flee. He was the great national writer of the Ukraine, the bandurists (troubadours) of which ascribe to him all their traditional songs, except the common songs of war and love.

SKRZYNECKI, JAN, a Polish general, born in Galicia, Feb. 8, 1786, died in Cracow, Jan. 12, 1860. He studied at the university of Lemberg, and in 1806, Dombrowski and Wybicki having called the Poles to arms, entered the patriot army. In the service of the grand duchy of Warsaw, he fought bravely in 1809 against the Austrians, in 1812 in Russia, distinguishing himself on the retreat of the grand army, in 1813 in Germany, and in 1814 in France, where his detachment saved Napoleon from falling into the hands of the Prussians at Arcis-sur-Aube. The kingdom of Poland having been organized by Alexander I., he entered the new national army with the rank of colonel, to which he had already risen under Napoleon. The outbreak of the revolution in 1830 took him by surprise, and for a few days, following the dictates of military honor, he remained with his regiment at the side of the fleeing grand duke Constantine, but on Dec. 3 offered his sword for the defence of the national cause. Appointed brigadier-general by Prince Radziwill, he displayed equal valor, strategic skill, and energy, especially at Dobro (Feb. 17, 1831) and at Grochow (Feb. 25), and on the morning following the latter battle was chosen to the chief command of the whole army, which he soon raised to a high degree of force and effectiveness. But having no confidence in the power of the nation to conquer independence by its own exertions, he proposed to himself to act the part of a Polish Fabius Cunctator in order to make an intervention of foreign powers possible, and thus failed to follow up the brilliant victories won at Wawre, Dembe, and Iganie, which almost broke the Russian forces under Geismar, Rosen, and Pahlen (April), and had to be commanded by the government to attack the Russian guards on the Narwa. This expedition, owing to strategic blunders, ended fatally with the bloody battle of Ostrolenka (May 26), in which, however, the bravery of the troops, as well as of the commander, shone with new lustre. Skrzynecki's further attempts betrayed great uncertainty of purpose, and were entirely futile, while the enemy's forces, under Paskevitch, gradually surrounded the narrowed circle of the Polish army with its centre, Warsaw. The populace clamoring against his inactivity, which was called treason, he was finally deprived of the command in chief (Aug. 10), and soon afterward joined the independent corps of Rozycki, which after the fall of Warsaw laid down its arms at Cra-

cow. Skrzynecki was for some time confined in Austria, where he had sought refuge, but subsequently escaped to Belgium, and was there appointed to a high command in the army, which however, owing to the protests of the eastern powers and the peace of 1839 with Holland, was of short duration. He then lived in strict retirement at Brussels, until allowed, shortly before his death, to spend the remainder of his days in his native country.

SKUA, the common name of the web-footed birds of the gull family, sub-family *lestridinae*, and genus *stercorarius* (Briss.). The bill is strong, the basal half with a membranous or corneous cere distinct from the tip, the nostrils opening under it in advance of the middle of the bill; the tip is abruptly and strongly curved; the wings very long, the 1st quill the longest; the tail wedge-shaped, the 2 central feathers projecting; tarsi strong, with prominent scales; claws sharp and curved, and feet fully webbed, with the hind toe short and but little elevated; the body is full and stout. They inhabit the high latitudes of both the northern and southern hemispheres; bold and piratical in their habits, they chase gulls and other marine birds, even the albatross, forcing them to disgorge a part of their food, which they seize before it reaches the water; they are hence called jagers or yagers; they feed also on the carcasses of cetaceans, the eggs and young of sea birds, and upon the smaller petrels. Their flight is elevated, rapid, long sustained, and generally in circles, as in birds of prey, which they represent among the *nata-tores*; the nests are made in company, of coarse grass, and are placed on rocks or sand, or in desolate heaths; the eggs are 1 or 2.—The common skua (*S. catarractes*, Temm.), the largest species, is about 2 feet long, with an alar extent of about  $4\frac{1}{2}$ ; the bill is  $2\frac{1}{2}$  inches; the color above is dark brown, the feathers tipped with gray; wings chocolate brown with the shafts and basal parts white; tail dark brown, white at the base; lower parts dark grayish brown; legs, feet, and bill black, the latter with a tinge of bluish; the central tail feathers project only an inch beyond the others. The favorite haunts of this species are the seas of northern Europe, especially about the Orkney and Shetland islands, where great numbers are killed for their feathers, which many prefer to those of the goose; it has been obtained on the California coast, and either this or a nearly allied species occurs about Cape Horn, the Cape of Good Hope and in the antarctic seas. It feeds on fish and small water fowl, and has been known to attack young lambs; it is very courageous in the defence of its young, attacking with eagle-like ferocity man, bird, or beast coming near its nest. The arctic skua (*S. parasiticus*, Temm.) is 21 inches long and 44 in extent of wings; the central tail feathers extend about 8 inches beyond the others, and are pointed at the end. This species breeds in the barren grounds of arctic America, coming down

as far as New York in summer and to the gulf of Mexico in winter, wherever its purveyors, the gulls, are found; it breeds also in the Orkney and Shetland islands, and at this period is gregarious; the eggs are  $2\frac{1}{2}$  by  $1\frac{1}{2}$  inches, of a dark oil-green color with blotches of liver-brown; it feeds principally upon fish and mollusks; it is confined to the northern seas of Europe, Asia, and America. The pomarine skua (*S. pomarinus*, Temm.) is about 20 inches long, with an alar extent of nearly 4 feet; the middle tail feathers exceed the others about 2 inches, and are of uniform width to the end. This species breeds in Labrador, coming in winter as far south as New York; it is also found in the seas of N. Europe; it lives on putrid fish and other animal matters cast up by the sea or disgorged by the smaller gulls. The eggs are grayish olive, with a few blackish spots. Buffon's skua (*S. cephus*, Brün.) is a little smaller than the last, and is found in Baffin's bay and about the coasts of arctic America; the 2 middle tail feathers are 6 or 8 inches longer than the others, and taper gradually to a fine point. The 3 last named species have been separated from *stercorarius* and formed into a genus *lestris* by Illiger. In the Antarctic ocean is the *S. antarcticus* (Less.), which by some is regarded as the *S. catarractes*.

SKULL, the oval, bony box which contains the brain of vertebrated animals. The antero-posterior diameter is the longest, and the widest portion is behind. It is made up of 8 bones, separate in the new-born child, but as age advances gradually consolidated into a single box, the points of union being called the sutures; the frontal bone forms the forehead, the parietals the sides and top, the occipital is behind, the temporals in the region of the ears, and the sphenoid and ethmoid at the base. The upper and inner surfaces of the skull are separated by a spongy substance, diploë, well supplied with blood vessels; the 2 tables are so independent of each other that the external may be broken without the internal, and *vice versa*; the arched form of the skull is admirably adapted to protect the enclosed brain, being able to resist very considerable force. The various forms of the skull are noticed under COMPARATIVE ANATOMY and the different orders and divisions of vertebrates; the shape, as characteristic of the human races, under ANTHROPOLOGY and ETHNOLOGY; its gradational development and vertebral homologies under PHILOSOPHICAL ANATOMY; and its more or less arbitrary division into regions under PHRENOLOGY.

SKULLCAP, the common name of ornamental herbaceous plants of the genus *scutellaria*, natural order *labiata*, all natives of the temperate regions of the globe. The root of the common skullcap (*S. galericulata*) is creeping, its stem erect, leafy or branched, the foliage of a deep green color tinted with purple; the leaves cordate at base, lanceolate crenate, wrinkled, an inch long; the flowers axillary, opposite, racemose, nearly sessile, blue variegated with

white, scentless. This species was once used in the treatment of intermittent fevers; its properties are only slightly tonic. It was also employed as a cure for hydrophobia, a fabulous virtue which is also ascribed to the *S. lateriflora*, a plant with small, blue, axillary flowers, and abundant in wet places in the United States. There are at least 30 species of skullcap, of which some are peculiarly North American. Several are distinguished for the beauty of their flowers, such especially as have crimson, blue, or violet corollas. They will grow in any soil, and are well adapted to the open flower border, increasing from seeds, cuttings, or division of the roots.

SKUNK, an American carnivorous mammal of the weasel family, badger sub-family, and genus *mephitis* (Cuv.). It may be distinguished from its congeners by a more slender and elongated body, pointed nose, feet adapted for digging, with the anterior claws the longest and the soles usually naked, and a long bushy tail. The cheek teeth are  $\frac{1}{2}$ — $\frac{3}{4}$ , the upper posterior being very large and nearly square; the head is small, with a projecting naked nose, small and piercing eyes, and short and rounded ears; the feet are short, with 5 closely united toes; the palms naked and the soles mostly so; they are essentially plantigrade, and walk with the back much arched and the tail erect; they are nocturnal in habit, and feed on animal substances. Though weak, timid, and slow in their motions, they are effectually armed against the most ferocious enemies in an acrid and exceedingly offensive fluid secreted by 2 glands whose ducts open near the anus; these glands are surrounded by a thick muscular covering whose contractions are sufficient to eject the fluid to a distance of 14 feet.—The common skunk (*M. mephitis*, Shaw; *M. chinga*, Tiedm.) is one of the best known and probably the most universally detested animal in the United States; it is from  $16\frac{1}{2}$  to 20 inches long, the tail being 13 or 14 additional; the prevailing color is black, with a narrow line on forehead, broad triangular patch on nape continuous with a narrow line on each side of the back, and tail tuft, white; the variation is considerable, the white markings being wider in some specimens, and in others wanting; the posterior 3d of the soles is hairy. When about to use its natural means of defence, it raises its tail over the back, and ejects the secretion in 2 thread-like streams with great force and accuracy; it is almost impossible to remove the odor from clothes impregnated with it, and a dog which has been touched by it is a nuisance for months; it is said to be phosphorescent at night. It is a very cleanly animal, and never allows its own fur to be soiled with its secretion. It sometimes commits havoc among hens, chickens, and eggs, but is far less injurious than the mink and weasels, and from its clumsiness is more easily detected; it feeds on small quadrupeds and birds, reptiles, insects, nuts, and fruits. It has from 6 to 9 young at a time, and would prove

exceedingly annoying were not great numbers killed by dogs and carnivorous mammals and birds, and caught in traps at the mouths of their burrows, which are generally near the surface, in level ground, and 6 to 8 feet in extent. They remain in their burrows in the northern states from December to the middle of February, laying up no winter stores, but retiring in a very fat condition, and remaining dull and inactive, though not properly hibernating. This species is widely distributed, being abundant in the northern and middle states, and found from lat. 57° N. to Florida and Louisiana, and west to the Mississippi river. Its flesh is white and fat, and if properly skinned in no way tainted by its secretion; it is highly esteemed by the Indians, and is eaten by the whites in various parts of the country; the fur is rather coarse, but is sometimes used by furriers for common purposes, and of late years thousands of skins have been annually carried to Europe, where they make their appearance in various disguises. The secretion has been successfully employed in some forms of asthma, in the dose of a drop 3 times a day, though it so taints the patient's excretions that the remedy is generally considered worse than the disease; it has also been used as a powerful antispasmodic in asthma, hysteria, and other nervous disorders, applied to the nostrils.—There are several other species in the United States, among them the white-backed skunk (*M. mesoleuca*, Licht.), with broad uninterrupted white dorsal band and entirely white tail; the Texas skunk (*M. varians*, Gray), of which an amusing story is told in "Audubon and Bachman's Quadrupeds of North America," vol. iii. p. 11; and the California skunk (*M. occidentalis*, Baird). All these are found in Texas and California; the last 2 are black, with much white, more continuous lateral stripe, and longer tail mostly or entirely black. The little striped skunk or zorilla (*M. bicolor*, Gray) is the smallest and handsomest of the genus; it is black with 4 parallel and interrupted dorsal stripes, and black tail with white pencils at the end; it is about the size of the ermine, but of stouter form and with longer tail; it is found in California and Texas. The black-backed skunk (*M. mesomelas*, Licht.) has densely hairy soles and short fore claws.

SKYE, the largest island of the Hebrides, on the W. of Scotland, forming part of Inverness-shire, from the mainland of which the narrow strait of Loch Alsh separates it; area, about 547 sq. m.; pop. in 1851, 21,521. The surface is mountainous. In the centre of the island the Cuchullin hills and other summits rise to the height of 2,000 to 3,000 feet above the sea. The shores, especially in the N., are very bold and picturesque, and are indented by many inlets or lochs. In the N. E. there are basaltic columns equal to those at Staffa. There are also a number of caves, some of which abound with stalactites of great beauty. In some of these the pretender Charles Edward was con-

cealed. The climate is variable; on the higher portions the snow lies long, and when it melts there are heavy rains. The soil is poor and the productions scanty. The greater part of it is in pasture, and devoted to the rearing of cattle and sheep. A peculiar breed of terriers known as the Skye terrier are raised here, and are in good demand. The herring fishery, though precarious, furnishes employment and subsistence to a large proportion of the inhabitants. The people are of Gaelic origin; they are peaceable and moral, but indolent and generally poor. The island contains many Danish antiquities. The greater part of the land belongs to Lord Macdonald and the Macleod family, and was the home of Flora Macdonald, who died here in 1790. The principal villages are Portree, Broadford, Stein, Kyle Haken, Oronsay, Armadale, and Uig.

SKYLARK. See LARK.

SKYROS, or SCYROS, an island of the Grecian archipelago, 24 m. N. E. from Eubœa; area, 60 sq. m.; pop. 2,630. It is separated by an isthmus into two peninsulas, the southern rising 2,566 feet above the sea, the northern more level and having fertile valleys. Grain, wine, and madder are raised; wheat, barley, madder roots, honey, wax, and oranges are exported. It has a very superior breed of goats. The island is abundantly supplied with fir and oak timber, and myrtles and the rose laurel are plentiful. St. George, on the N. side of the island, is the only town.—The Greek poets made this the hiding place of Achilles, and the place where Theseus was slain. It was conquered by Cimon in 469 B. C., and alternately held by the Athenians and their rivals for 2½ centuries, and finally was restored to the former by the Romans, 196 B. C. In the middle ages it was part of the duchy of Naxos, and afterward of the Ottoman empire. It now belongs to the kingdom of Greece.

SLANDER, in law, defamatory words falsely and maliciously spoken, and injurious either in fact or in legal presumption. It is actionable slander: 1, to speak of one thus falsely and maliciously words importing his guiltiness of an offence involving moral turpitude or punishable by law; 2, to charge him with having such an infectious, or perhaps disgusting disease as, if known, would probably cause his exclusion from society; 3, to use in regard to one in office, or of a person in reference to his profession, trade, or business, such language as has a natural tendency to cause him damage or loss, either because the language implies the lack of some requisite qualification for the occupation or profession, or because it implies insolvency or some positive misconduct or dishonest practice in the business or calling; 4, to speak words which, though not naturally or presumptively productive of loss, have nevertheless caused actual damage to the person slandered. Of these four classes of slanderous words, the first, second, and third include those that are actionable, as the phrase is, *per se*, or



of themselves; that is to say, if the plaintiff proves that the words were spoken, he recovers damages without proving any particular loss. They are naturally and immediately injurious to the reputation, and so naturally and immediately tend to affect the business or comfort of him of whom they are spoken. An action lies for words of the fourth class only when the plaintiff can prove express and special damage.—Of the form of slander which imputes guiltiness of crime, it is to be observed that the immediate ground on which the law founds the action is that injury to the party's reputation and his consequent degradation in society which is the natural and immediate incident of criminal guilt. The words must therefore suggest an offence which subjects the party to a criminal prosecution and to infamous punishment. After reviewing the authorities on this point, Starkie concludes that the imputation of any crime or misdemeanor, for which corporal punishment may be inflicted in a temporal court, is actionable without proof of special damage. When the penalty for an offence is merely pecuniary, it does not appear that an action will lie for charging it, even though in default of payment imprisonment should be prescribed by the statute, the imprisonment not being the primary and immediate punishment of the offence. In a leading case in New York (*Brooker vs. Coffin*), in which the supreme court lays down what it conceives to be the safest rule and one warranted by the case, it is held that "the words will be actionable in themselves in case the charge, if true, will subject the party charged to an indictment for a crime involving moral turpitude, or subjecting him to an infamous punishment." Thus, to charge forgery or counterfeiting, keeping a bawdy house, bribery at an election, and the soliciting one to commit murder, are all actionable slanders *per se*, for they suggest both moral turpitude and an indictable offence. For the same reason it is actionable *per se* not only to say that one has done enough to send him to the penitentiary, but to say that he has already been there. But to charge one with breaking open and reading a letter is not a slander; for, though the offence is indictable, it hardly involves moral turpitude; while, on the other hand, to allege that one lives by imposture imputes indeed moral turpitude, but not an indictable offence, and is consequently not slanderous *per se*, or without proof of actual damage. Words alleging perjury are actionable of themselves. The language must of course either express or imply all that is essential to constitute the crime, to wit, a judicial proceeding, material testimony, and the other essential elements of perjury. A charge of false swearing which does not expressly or implicitly comprehend all these points, is not slanderous. Theft is an indictable and infamous offence, and the false and malicious imputation of it is actionable without proof of damage. One may sometimes call another a thief, just as he calls

him scoundrel, liar, or cheat, by way of general abuse, and without any intention of charging the crime of larceny to him. If the defendant can show this clearly, he may defeat the presumption which the law always makes of a slanderous quality and intent in the word. Where fornication is made punishable by statute, as it is in most of the states, it is slander to charge unchastity. An action of slander is expressly given by statute in Alabama, North and South Carolina, Kentucky, Illinois, Missouri, and probably elsewhere, for the imputation of incontinency or adultery. Words charging disease are actionable only when they imply that the disease now exists.—The third class of slanderous words includes those imputations which affect one's official, professional, or business character. To be actionable of themselves, the words must immediately contemplate and touch these relations; for it is invariably held that where the words complained of, though calculated in every respect to cause the forfeiture of an office or the loss of the income of a profession or business, are nevertheless not in fact applied to the conduct of the plaintiff in his office or business, the action for slander fails. Thus a schoolmistress has failed to maintain an action for words which, though charging her with unchastity, did not directly involve her conduct in her profession; and where one said to the clerk of a company: "You are unfit to hold your situation," and then alleged his immorality with women as the reason of his unfitness, yet because the words did not charge or imply the want of any of those qualities which were requisite for the proper discharge of the duties of the clerkship, the action failed. Words however which necessarily, even if not in terms, refer to and affect one's business relations, may be held slanderous; as to say, for example, in reply to an inquiry about failures: "I understand there is trouble with the Smiths," or "B owes more money than he is worth, and is broken." So it is slanderous *per se* to say that a trader is insolvent, that X keeps none but rotten goods, that Y uses filthy water in making his beer, or that Z keeps false books, where keeping books is a necessary incident to the business. It is slander to charge an attorney or physician with general ignorance or unskilfulness in his profession; and words which of themselves allege ignorance or unskilfulness in a particular case may be actionable if they fairly imply general disqualification in these respects.—The fourth class includes those words for which an action lies if special damage be proved. Thus, to say of another that he is a knave, a blackleg, a liar, a cheat, or a scoundrel, is generally not actionable. If, however, the speaking of these or the like defamatory words has wrought the plaintiff particular pecuniary loss, he can recover damages. Within this class fall those cases in which incontinence has been charged to women. Though the disgrace or contempt which has

resulted from false imputation will not support an action, yet such pecuniary loss as attends the plaintiff's exclusion from houses where she has hitherto found a home, has been construed to be sufficient legal damage.—In all cases in which an action for slander lies, an essential principle on which the action rests is that the speaking of words false in fact and injurious to the reputation of another is malicious. By malice in this place is to be understood, not that disposition of ill will, spite, or revenge, which in common parlance the word implies, but that legal malice which is the presumption and conclusion of the law from the fact of the deliberate and unqualified statement of false and defamatory matter, without cause or justification. Where these elements coincide, the law implies the malice, and the slander is complete. It is the corollary of this conception of slander that a defendant cannot justify the speaking of the slanderous words by the plea that he merely repeated the language of another. Formerly, indeed, it was held, on the authority of an old case in Coke, that if the defendant, at the time of uttering the words complained of, named his informant and gave his precise language, so as to furnish the plaintiff with a good cause of action against him, these facts might be pleaded as presumptive proof that the defendant did not utter the slanderous words maliciously. But the latest English cases hold that the defendant's plea must go further, and must show in addition to the facts just mentioned that he believed the charge to be true, and repeated it with a justifiable intent and on a justifiable occasion. If this rule embraces the very comprehensive terms justifiable intent and justifiable occasion, it may perhaps be said to be that of the American law in respect to repetition; but if those terms be taken away, the plea would probably be insufficient here. In other words, it will not, according to the better American authority, justify the repetition of a slander, that the defendant at the time of uttering the words disclosed the name of the person who had already published them, and that he believed them to be true. In a very recent case in Massachusetts, it was held that the repetition of oral slander already in circulation, without expressing any disbelief of it or any purpose of inquiring as to its truth, though without any design to extend its circulation or credit, or to cause the person to whom it is addressed to believe or suspect it to be true, is actionable. So long, in short, as the legal presumption of malice stands un rebutted, the uttering or repeating of slanderous words is actionable. To refrain altogether from the repetition of such words is the only way to be entirely safe. The presumption of legal malice is defeated when the otherwise slanderous language is employed upon a just occasion, in the discharge of a duty or in the protection of an interest. Such communications as these are said to be privileged, and the burden of showing malice expressly is thrown upon the plain-

tiff. In a leading case upon this subject in the supreme court of the United States, privileged communications were divided into four classes, viz.: 1, publications duly made in the ordinary mode of parliamentary proceedings; 2, words used in the course of legal or judicial proceedings; 3, any thing said or written by a master in giving the character of a servant who has been in his employment; 4, words used by any one in good faith in the discharge of any public or private duty, legal or moral, or in the prosecution of his own rights or interests. With reference to the first of these classes, the exemption from liability for any words spoken in debate is expressly provided by the constitution of the United States, and is probably repeated in the declaration of rights or in the constitution of every state in the Union. It is matter of public interest that there should be the utmost freedom in this respect. On construction of the constitutional provision in this behalf in Massachusetts, the exemption was held to extend to every thing said or done by a representative in the discharge of his office, whether in debate in open session of the house, or more privately out of the house in committee, or even during the ordinary adjournment of the sessions. On the same principle, namely, the public interest in the prompt, unembarrassed, and efficient administration of the laws, all language spoken in good faith in the course of legal proceedings before a competent jurisdiction, pertinent in any wise to the matter in question, enjoys perfect immunity. The benefit of the privilege is secured alike to the parties, the counsel, the witnesses, the judges, and the jury. As to statements made by masters in reference to the character of their servants, good faith will be presumed, and it is for the servant to negative the presumption. Malice will be implied if he shows the falsehood of the charge; and there may be a *prima facie* presumption of malice if a master volunteered the unfavorable statement respecting his discarded servant. Communications claimed to have been made in the usual course of business (between tradesmen, for example, respecting the solvency of parties whom one of them is about to trust), where the one to whom the communication is made has an interest to be protected and a right to know the facts told him, are generally closely scrutinized when they are volunteered, or are made in reply to an inquiry suggested by the defendant, or are not closely limited to matters in which the party to whom they are made has an actual interest.—In a civil action for slander, the truth of the facts imputed may be pleaded by the defendant in justification. If the plea is maintained by proof, the action is defeated; for the principle is, that if the plaintiff is guilty of the whole matter charged to him, he has sustained no injury and has therefore no valid claim for damages. The amount of the damages lies almost entirely within the discretion of the jury. They may give punitive or vindictive damages

in cases of wanton and unqualified malice; and even though the amount may seem excessive, yet the court will not generally set the verdict aside, unless it shall be plain that the jury was influenced by improper motives or was misled by some gross error or misconception.

SLATE, a rock of no definite composition, distinguished by its structure, which is of parallel sheets or laminae, easily separated from each other. The term is in common use also applied to various rocks which do not possess the fissile character in so eminent a degree, and which are sometimes distinguished from the true slates by the name schists; such are the mica, talcose, hornblende, and chlorite schists or slates, described under their own definite names. Shale differs from slate in its more earthy texture and less tenacity, as well as want of the perfect slaty structure. Its composition is however like that of the argillaceous or clay slate, which is the well known roofing and writing slate. This variety, which is the only slate of economical importance, is not limited to any one geological formation, but is found among the metamorphic rocks passing into mica slate, and with the strata of the silurian period, and sometimes with those of still later origin. It is eminently characterized by splitting with ease into large smooth plates, which have a uniform degree of hardness, possess a dull or feeble lustre, and are of blackish gray, bluish black, bluish or reddish brown, purplish, or greenish color. The rock is often traversed by thin seams of quartz, but the prepared slates should be entirely free from foreign minerals, and especially from iron pyrites, which are too often seen in yellow cubical crystals scattered over the surface of what would otherwise be excellent roofing slates. Such are unfit for writing or school slates; and for roofing slates they are objectionable on account of the pyrites weakening the slates, and also being liable to decompose after exposure for some time, and cause unsightly stains of oxide of iron. Carbonate of lime is also sometimes present, and is likewise injurious. The best slates are distinguished by an appearance of compactness and solidity in the blocks, with nothing to suggest their fissile character; and yet this should be so perfect, that when fresh from the quarry these blocks may be split with greater ease than pine timber, and into sheets of any desired thinness. The faces should be perfectly smooth and parallel, without any curvatures or irregularities. There should be no lines of cross fracture that should prevent their breaking in any one direction more than another. When one is balanced on the finger and struck with a hammer, it should give a clear ringing sound; and after being dried in an oven and immersed in water, it should absorb but little, as may be ascertained by weighing it before and after immersion. This is an excellent test of the comparative values of different slates. The powder of slates is of a light gray color, and when a pointed piece is rubbed upon a smooth slate surface

a portion of the powder remains behind, leaving a plain mark that is easily wiped or washed off. It is this property which renders the slates serviceable for drawing and writing upon, for which use they are in large demand for schools, both in light portable forms set in wooden frames, and large sheets affixed to the walls and answering for blackboards. Argillaceous slates, like the clays which they originally were, are essentially composed of siliceous and alumina, and the following is the result of the analysis of a common Scotch variety: siliceous, 50 parts in 100; alumina, 27; oxide and sulphate of iron, 11; potash, 4; magnesia, 1; water, 7; carbon, a trace. The slates are found often in beds of great extent, associated with other beds of similar character; and this singular feature is observed in the structure of the rocks, that the cleavage, or lines along which the slates naturally separate, has no relation to the lines of stratification. However much the beds themselves may be contorted and follow irregular waving planes, each system of cleavage lines, in case there are more than one, as sometimes occurs, maintains its own direction and rarely coincides with the plane of dip. It is evident that the cleavage seams must have been produced subsequently to the time when the beds acquired their final position. This structure is what is known as slaty cleavage; and sometimes when the strata are themselves thinly bedded and the stratification is regular over extended areas, it is not easy to distinguish immediately the two sets of planes one from the other.—Slate rocks are of common occurrence in districts of the metamorphic and silurian formations; but they are not often of good quality for working, and very rarely are found hard and sound until they have been followed to some depth beyond the reach of atmospheric influences. Quarries of great extent are worked in North Wales; in Cumberland, Westmoreland, Cornwall, and other counties in England; in Argyleshire, Scotland; and others have been opened in Waterford and other counties in Ireland. The product of the Welsh quarries has been largely exported to the United States, ships returning from Liverpool, after carrying there a load of cotton, often stopping at Bangor, Wales, for a load of slates from the quarries in its vicinity. This business has of late years received a serious check by the opening of valuable quarries in Vermont, New York, Pennsylvania, and Maryland. The Welsh quarries in Caernarvonshire were opened toward the end of the last century by Lord Penrhyn, who went to great expense in establishing the business by constructing roads to the water and providing the necessary facilities for loading vessels. Early in the present century numerous other quarries were in operation in the same region. Lord Penrhyn was succeeded by his relative, Col. Pennant, under whose direction the business was greatly extended, giving employment to over 2,500 persons, and producing an enormous annual revenue. The

beds are traced several miles in length, and the excavations upon them are in many places immense. They extend into the sides of the hills in a succession of terraces, one above another, sometimes to the number of 12, each of them 60 feet high; railroad tracks are laid upon each for carrying away the materials excavated. In different localities the beds occur variously inclined from a horizontal to a vertical position; and the quarries are distinguished as the tally or roofing slate, and the rock or slab slate quarries, the former producing the thinly laminated varieties, and the others the thicker sheets only, such as are used for grave-stones, flagging, billiard tables, mantelpieces, partitions, floors, and other architectural purposes. In one instance, 10 miles back from Derwenlass, Wales, an attempt has been made to mine the slate without taking off the cover; and at the Delabole quarries in Cornwall, the works have been sunk considerably below the sea, to a total depth of more than 800 feet.—In the United States, slate quarries of great extent were opened in 1839 on the Piscataquis river in Maine, about 40 m. above Bangor. The slates they afforded were of excellent character; but the remoteness of the locality from water transportation has prevented their coming into competition with the Welsh and Vermont slates. The principal quarries of the latter state are in West Castleton and Poulteney, Rutland co., and in Guilford, Windham co. They were first worked to any extent about the year 1852, and are already employing many hundred men under a number of independent associations. The beds are traced many miles in length, and sometimes they are more than a quarter of a mile across. They dip E. N. E. at angles varying from 12° to 20° with the horizon, and produce in the different strata slates sometimes of bluish, greenish, or purple color. Though the quarries are very shallow, the slates are fully equal in quality to the Welsh slates, and are obtained with great facility by open cuts extending along and into the side of the hills. Slabs are readily procured from some of the quarries about 20 feet long and as thin as 1½ inches. In New York, slate quarries are worked near the Vermont line at Granville and Hoosic, Washington co. The slate formation crosses northern New Jersey, and is worked near Newton in Sussex co., and on the Delaware river. On the other side of this river it ranges across Northampton and Lehigh cos., the N. line of the formation being along the S. E. side of the Blue or Kittatinny mountain. The earliest quarry opened was on this mountain about the year 1826 and about a mile from the Delaware Gap, by Mr. James M. Porter, assisted by Mr. Samuel Taylor. The product proved in part of excellent quality for school slates, and a manufactory of these was established, the first of the kind in the country. A village grew up at the foot of the mountain, and was known as Slateford. The roofing slate was most abundant, and was very extensively quar-

ried and sent down the river on rafts to Philadelphia and the intermediate towns. The school slates being split out from the blocks are taken to the factory, where a man provided with patterns of the 6 sizes usually made, marks out upon each sheet such slates as it will make to the best advantage. Another workman then cuts them out with a circular saw made of soft steel, and they are dressed, smoothed, and polished by a third. Before machinery was applied to these operations the slates were shaved like shingles, the operator seated on a wooden horse, and using a drawing knife. The smoothing is finished by rubbing the slate with a rag filled with its own dust, when the gray color of the powdered slate gives place to the deep blue tint. The slate is now washed, and is ready for the frame. When wild cherry lumber was abundant, this was generally used; but birch is now used instead. The pieces are cut out by circular saws, and grooved and morticed by others specially adapted to the work. The frame is then put around the slate, and holes are drilled in the corners for the wooden pins which fasten the whole together. By a recent improvement the frames are sawed out of two entire pieces with round corners, glued together over the edges of the slate. The frames are finally smoothed with a plane, and the slates are packed in cases, each holding either 8 dozen or 100. As the business increased new quarries were opened in the vicinity, and about a dozen factories for making school slates have been put in operation, of capacities varying from 300 to 1,600 slates a day; till, with those made on the Lehigh, the total production in Pennsylvania and New Jersey is estimated to amount to some 20,000 cases annually, worth at least \$10 per case. The Lehigh quarries are near the base of the same mountain, about 2 m. from the Lehigh Water Gap, at the village of Slatington. They were opened in 1848, and in 1852 their products were 2,500 squares of roofing slates\* and 800 cases of school slates; in 1855, 6,000 squares of roofing and 1,600 cases of school slates; since which time the business has continued to enlarge. In 1854, over 300,000 feet of lumber was consumed in slate frames alone. In Lehigh co., it is stated, there are about 30 slate quarries open, and producing at least 25,000 squares of roofing slates, valued at \$3 per square at the quarry. The country demand, especially among the German farmers, is large for the slates, shingles finding little favor with them; and the prosperous mining towns in the neighboring anthracite region are also largely supplied with them; while by the canal and railroad large quantities are sent to the cities and towns near the seaboard. In Maryland, slate quarries have been worked to a considerable extent in Harford co. for the supply chiefly of Baltimore. Further south, extensive beds of superior slates are described by Prof. C. U. Shepard as examined by him in Pike co. in N.

\* Each square contains slates to cover 100 feet square.

W. Georgia. They are found together with other beds of flagging stones between the mica slates and the lower silurian limestones of this region, lying in a N. E. and S. W. direction and dipping  $40^{\circ}$  S. E., and with cleavage seams running N. to N.  $10^{\circ}$  E. and pitching  $87^{\circ}$  W. The blocks split with ease into 6 or even 8 sheets to the inch, and these are perfectly even and regular.—Slates are quarried either by blasting out large slabs, or, when practicable, splitting them off with gads and large wedges. The slabs from a foot to a foot and a half thick, and it may be 8 or 10 feet long and 1 or 2 wide, are set on edge, and grooves are cut across the top and down the sides to determine the lines of fracture for separating them into rectangular blocks, which is done by blows from a wooden beetle directed upon the top near the furrow. The splitting is effected by driving wide, thin chisels between the laminae, and the sizes of the slates are reduced whenever desirable by cutting cross grooves and then breaking the pieces with the chisel. When reduced to the required thinness, the slates are roughly dressed over the edge of a block of wood by the blows of a sort of chopping knife called a sack, sax, or zax. On the back of this tool is a sharp tapering steel point, with which the workman when preparing roofing slates pecks two holes through the slates near what is to be the head or upper edge for the nails which are to hold it down to the roof. In Vermont machines have been applied to cutting grooves in the slate in the ledge to facilitate the quarrying, and the cutting and trimming are also done by machinery. It is important that all this work should be done while the blocks are fresh from the quarry, as in drying they are apt to lose their property of freely splitting, though freezing may restore this; but a succession of frosts and thaws has the effect of thorough seasoning. Slabs for internal decoration, as mantelpieces, and for articles of furniture, as table tops, billiard tables, sinks, &c., are cut by circular saws which are made to revolve with a slow motion. The sheets when thus squared to suitable sizes are planed in machines similar to those used for planing metals; and pieces for mouldings are shaped by tools of the desired figure. Various ornamental articles are prepared of slate in imitation of marbles, granites, &c., by the application of colors, which are baked in, varnished, and polished; the applications being several times repeated. (See ENAMELLING, vol. vii. p. 142.) Globes have been made of slate. (See GLOBE, vol. viii. p. 300.)—Roofing slates in Great Britain are classified, and the workmen are paid for them, according to their sizes. For the "queen slate," which measures 36 by 20 inches, the quarrymen receive 8s. per ton. The "imperial" ranges from 3 feet in length and  $1\frac{1}{2}$  feet in breadth to 2 feet by 1 foot, and for these the pay is 6s. 6d. per ton. "Duchesses" are 2 feet long and 1 foot or sometimes less in width; these are paid for by the thousand (1,200), at the rate of 25s.

"Countesses" are from 20 to 18 inches in length and about 10 inches wide; for these the pay is 10s. a thousand. "Ladies" are usually about 15 inches long and about 8 inches wide. "Doubles" are the smallest size produced at Penryn, and are paid for at 5s. a thousand; in Cornwall these measure about 13 inches by 6. From the report of the receipt of Welsh slates in Charleston, S. O., presented by Prof. Shepard, of the date of April, 1858, it appears that the importation for the preceding 4 years had amounted to 1,143 thousand, each thousand comprising 1,200 slates; that these were of two sizes only,  $16 \times 10$  and  $16 \times 8$  inches, and cost respectively 77s. and 59s. sterling per thousand. The average weight of the thousand (1,200) is about  $1\frac{1}{2}$  tons.—The smaller sized slates, as doubles and ladies, are laid upon a flooring of boards, which to form a tight roof should be closely fitted at the edges and well secured to the rafters. For the larger sizes narrow strips or battens are nailed across the rafters at suitable distances apart, according to the size of the slates used, and upon these the slates are nailed, commencing with a row of the largest slates along the eaves. A line is then struck along the upper surface of these slates parallel to the lower edge, to mark the distance that the slates of the next course shall overlap them. The second course is then nailed down, the joints between two adjoining slates being brought as near as may be over the middle of the slate beneath. Thus the work is carried on up to the ridge, where the slates are trimmed off even and a covering of sheet lead is bent down and secured over them. The slope of slate roofs should be not less than  $25^{\circ}$ . When well constructed and supported, a slate roof is perfectly tight, and may last a great many years without repairs. It is not affected by changes of temperature like the coverings of metal, and is only objectionable for all classes of houses on account of the extra strength required to sustain the weight. Slate roofs have been made of only  $10^{\circ}$  rise by using slates wide enough to reach from one rafter to another, and covering the joints up and down the rafters with narrow slips bedded in putty and screwed down. By this method little overlap is required; but if any settling of the building occurs, the joints are liable to be loosened and let in the rain. Wherever the joints caused by the overlapping slates are exposed on the under side, they should be filled in with lime and hair to exclude the wind and snow.

SLATER, SAMUEL, an American manufacturer, born at Belper, Derbyshire, Eng., June 9, 1768, died at Pawtucket, R. I., April 21, 1835. At the age of 14 he was apprenticed to the cotton-spinning business under Jedidiah Strutt, the partner of Arkwright, and possessing a highly mechanical turn became thoroughly familiar with every part of the business, and made such improvements in it that before he came of age his master intrusted him with the supervision of a new mill and with the con-

struction of its machinery. After completing his term of service, he sailed for New York; and as the laws of England against the emigration of artisans were very severe, he took no drawings of machinery, but intrusted the whole to his tenacious memory. Meeting with Messrs. Almy and Brown of Providence, in search of a manager for a small cotton mill, which for want of suitable machinery was not successful, he accepted an offer of an interest in their business on condition that he would undertake the erection at Pawtucket of the improved machinery of the Derbyshire mills. He made his drawings and designs from memory, and, after surmounting almost innumerable difficulties, in Dec. 1790, started the first successful cotton mill in the United States. The business increased slowly at first, and it was not till the connection of the power loom with the spinning jenny in 1806, which enabled them to consume their yarn in the manufacture of cotton cloth, that it commenced a rapid growth. Later in life Mr. Slater became interested also in the woollen and iron manufactures. In 1806 he commenced a Sunday school for the moral and intellectual improvement of his workmen and their families, one of the earliest of those institutions established in the United States.

SLAVERY, the condition of absolute bondage, in which one person is the unconditional property or chattel of another, and obliged to labor for his master's benefit, without his own consent having been obtained. It has existed in some form in all nations, and still exists in many countries, though modern slavery differs in several respects from ancient slavery. At what time it originated we have no means of ascertaining, as it was in perfect existence at that period which is spoken of as the dawn of history, and allusions to it are found in some of the earliest extant writings. When Joseph was sold by his brethren to the Midianite merchantmen, the transaction was one that belonged regularly to the caravan traffic in which the purchasers were engaged, the slave trade being then formally established; and the purchasers took him to Egypt, and sold him to Potiphar, slaves being imported into that country, and slavery there existing, either as a punishment for crime, or because of the taking of prisoners in war, or through the success of forays into other countries, or from the sale of strangers who had been cast on the coast. Kidnapping was a common mode of obtaining slaves for commerce, and it was extensively followed by the Phœnicians, as appears from the Homeric poems, as much as 3,000 years ago, and the slave trade was then in full vigor, thus testifying to the existence of slavery long before that date. Slavery first appears in China about 18 centuries B. C. In India the number of slaves was small, and it has even been asserted that slavery was there prohibited by positive law; but the lower castes could be enslaved for debt. Slavery existed among the Assyrians, the Babylonians, and the Persians af-

ter they had become conquerors. The conquering races who established their rule, in succession, in that quarter of the globe, found slavery there existing, and in some instances they increased its extent; but the general tendency of extensive conquests was to lessen the number of slaves, for when different races became subject to the same royal line, and peace prevailed, as in the Persian empire, which extended from Egypt to India, the supplies of slaves were largely cut off, as those supplies were principally obtained through war. The Jews had some form of slavery from the time of Abraham, with whom their historical existence commences. Their own long enslavement in Egypt was of a political, not a personal nature, and probably did not prevent them from holding slaves. The Mosaic legislation concerning the various kinds of servitude was very mild, and contained numerous important limitations of the rights of masters. In Phœnicia slaves were very numerous, and were extensively employed in all the various branches of industry that were pursued by that enterprising people. They formed much the larger part of the populations of such cities as Tyre and Sidon. In Carthage there was a revival of Phœnician life, after its force had been spent in the East; and slavery was still preserved in the Carthaginian empire.—Slavery meets us in Greece when we first begin to know any thing of the condition of that country, and long before the commencement of its true historic period. Slavery was a firmly established institution of the Hellenic heroic age. It was the consequence of invasion and conquest, and it led to further wars that were waged in order to procure more slaves. Piracy and kidnapping were resorted to for the same object, and no degree of life was exempt from the effects of this state of things. Yet in the heroic age Grecian slavery was a mild institution. "In Homer," it has been truly said, "the condition of the slave seems everywhere tempered by the kindness and indulgence of the master." The condition of women, however, was worse than that of men, which is repugnant to modern ideas. "The slavery of legendary Greece," says Grote, "does not present itself as existing under a peculiarly harsh form, especially if we consider that all the classes of society were then very much upon a level in point of taste, sentiment, and instruction. In the absence of legal security or an effective social sanction, it is probable that the condition of a slave under an average master may have been as good as that of the free *thete*. The class of slaves whose lot appears to have been the most pitiable were the females—more numerous than the males, and performing the principal work in the interior of the house. Not only do they seem to have been more harshly treated than the males, but they were charged with the hardest and most exhausting labor which the establishment of a Greek chief required; they brought in water from the spring, and turned

by hand the house mills which ground the large quantity of flour consumed in his family. This oppressive task was performed generally by female slaves, in historical as well as in legendary Greece." Every Greek state, with a few exceptions, had slavery among its institutions, the Greeks, according to Aristotle, considering it as derived from the laws of nature, and the permanent diversities in the races of men. The treatment of slaves was very different by the different Greek communities. The Athenians were very kind toward them, and throughout Attica prevailed the mildest form of servitude known to the world of antiquity. Athenian legislation protected the personal rights of the slave, and promoted his efforts to obtain freedom. Slaves who were ill treated could take refuge in the temples of the Eumenides and of Thesus, whence they could be expelled only by sacrifice; but the exercise of this right had probably severe practical limitations. There were both public and private slaves at Athens, the former being the property of the state, some of whom were educated and filled important offices, such as those of secretaries of the commanders and treasurers of the armies. Sparta was regarded by Greece as furnishing the practical antithesis to Athens in the treatment of slaves, and the opinion has come down to modern times. The helots of Sparta furnish the type of all that is calamitous among the oppressed, and there is much in Spartan history that justifies this view of their condition. Who they were is not known, at least not with precision; and there is also dispute as to the exact nature of their relation to the ruling race. The Dorian conquest of Laconia, which occurred more than 1,000 years B. C., had no little effect on the course of Greek history; but it bore with great severity upon the conquered races, the Achæans and their dependants. K. O. Müller, whose authority on every thing that relates to Grecian history is very high, thinks that the helots "were an aboriginal race, which was subdued at a very early period, and which immediately passed over as slaves to the Doric conquerors." They were slaves of the state, and those by whom they were held could neither liberate them nor sell them out of Laconia. The state apportioned them to individuals, but not in full possession, and reserved to itself the power of enfranchising them; but even the state could not sell them out of the country. They appear to have occupied some such position as was held by the serfs of the middle ages, but the central authority had more power over them. They acted as light troops in the Spartan armies, and in return for military good conduct they were occasionally emancipated. Müller plausibly argues against the common statement that the Spartan youth annually engaged in the chase of the helots, assassinating them by night, or massacring them formally in open day, for the purpose of lessening their numbers, and weakening their power; but the story told by Thu-

cydides of the mysterious disappearance of 2,000 helots, who had been selected for freedom and the field, does not sustain his views. It is certain that the helots more than once rose in revolt against their masters, at important crises of the history of Sparta, and with much effect thereon. When revolted helots were subdued, the treatment of the whole class became more rigorous, and this may account for some of the statements respecting their condition which are apparently contradictory. In Thessaly the Penestæ held a position not unlike that of the helots in Laconia; but it was milder, and they were not subject to the whole community, but were possessed by particular families. The Gymnesii of Argos were bond slaves, and were the helots of that state; and a similar class existed in Sicyon. In Crete there were both private slaves and a class of public villeins. In Sparta the domestic slaves were selected from the helots. The supplies of slaves were obtained in most parts of Greece through war, commerce, piracy, and kidnapping. There were regular markets for their sale, the principal of which were held at Athens and Chios. Negroes were among the slaves imported, Egypt furnishing the larger number of them; and they were valued for their complexion, and considered as luxuries. The evils of war had at first been softened by the practice of reserving prisoners to be sold as slaves, but in time war was waged in order to obtain slaves for the market. Most of the domestic and personal slaves were barbarians, that is, persons who were not of Greek blood, for it was the Grecian custom to allow prisoners of their own race to be ransomed. The number of slaves in Greece was very large, and it is estimated to have been 3 or 4 times as great as that of the free population. The details that are given, however, are not to be relied on, it being impossible to believe, for instance, that so small a place as Ægina had 470,000 slaves, though it is not improbable that there were 400,000 in Attica, and 460,000 in Corinth; but even these numbers are to be accepted cautiously. Unlike the Romans, the Greeks did not seek to possess many slaves from motives of luxury and ostentation, but of profit. Fifty slaves were a large number for a wealthy Athenian to own, while some Romans owned 20,000 each. There were many slaves employed in the mines, but they were of the least valuable kind, and their labor was destructive of life. Most of the slave insurrections in Attica were brought about by the mining slaves, and on one occasion they took possession of Sunium, and held it for some time. The Athenian slaves were not, save on extraordinary occasions, employed as soldiers, like those of the Dorian Greeks. They fought at Marathon and at Arginusæ, but these were remarkable exceptions to the rule. Manumitted slaves in Greece could not become citizens, but became metics, and were still under certain obligations to their former masters,



neglect of which made them liable to be sold into slavery again.—In Italy slavery prevailed even more extensively than in Greece, though in the early times, it has been contended, and before the foundation of the Roman dominion, the number of slaves was so small, and they were so well treated, as hardly to deserve the name; but as there is evidence that the Etruscans had negro slaves, the slave trade must have been extensively carried on between Italy and Africa at a remote period, though probably indirectly. We find that the Romans had slaves at the earliest dates of their history, and far more early than that time which is recognized as the beginning of their authentic history; but there was a great difference between the institution as it existed in the opening years of the republic and as it became several generations before the establishment of the imperial rule. As the kingdom of Rome was a far more powerful state than was the Roman republic during the first two centuries of its existence, and had commercial relations with the Carthaginians, the principal slave traders of the time, the just conclusion is that slavery was a more extensive institution under the later kings than it was under the prætors and early consuls. According to the old tale of the foundation of Rome, Romulus made his city an asylum for fugitives from slavery, so that the nation which was beyond all others to uphold and to extend slavery, owed its existence in part to a disregard of the claims of slaveholders; and the story implies that there must have been a large servile class in the surrounding country 7½ centuries B. C. "The fact of slaves being acquired at Rome in the reign of Romulus himself," says Blair, "is to be gathered from his regulations for the disposal of captives taken in war. From that time the number and importance of the slaves of the Romans are abundantly attested, by authorities of all descriptions, and of every period, down to the fall of the western empire." In the early times nearly all the domestics of the Romans were slaves, and so were the majority of the operatives in town; but that excess of agricultural slaves which in later times became a marked feature of Roman industrial life was then unknown. Niebuhr, speaking of Capua, says: "The number of slaves must have been great in the city in which gladiators arose; and even the high cultivation of the arts, which were practised by slaves in the ancient republics, although superintended by freemen, leads us to suppose an overwhelming number of them in every manufacturing town." Agriculture was considered an honorable pursuit, and the haughtiest of the patricians often cultivated their fields with their own hands; for they were not all rich, as the story of Cincinnatus shows. The first slaves of the Romans were exclusively prisoners of war made from the peoples in their immediate vicinity, and sold at auction by the state as booty; they strongly resembled their masters, so that their

condition was probably not a hard one; but there was a constant change for the worse as the circle of Roman conquest extended. The Roman slaves were obtained by war and by trade, through the operation of law, and by birth. So long as the wars of the Romans were confined to their own immediate part of the world, the numbers obtained by war could not have been very large; but when their armies began to contend with distant peoples, and to conquer them, they were counted by myriads. They claimed to act on the principle of sparing the humble and subduing the proud, in accordance with which they granted both life and liberty to those who surrendered, but took captive all those who resisted their arms, and, after leading them in triumph, consigned such of them to slavery as were not reserved for a fate more immediately severe. "Surrender, *deditio*," says Arnold, "according to the Roman laws of war, placed the property, liberties, and lives of the whole surrendered people at the absolute disposal of the conquerors; and that not formally, as a right, the enforcement of which was monstrous, but as one to abate which in any instance was an act of free mercy." The Romans were not sparing in the infliction of this severe rule of war, and the consequence was, not only that the slave population was rapidly increased, but that it was made to include the most cultivated classes of the most cultivated period of antiquity, as the Roman conquests did not commence until after the highest of ancient races had completed their mental and material development. When the Romans made their first invasion of Africa, 256 B. C., under Regulus, they landed in a portion of the Carthaginian territory lying between the Hermæan headland and the Lesser Syrtis, which, for richness and culture and the refinement of its inhabitants, has been correctly described as resembling "the approach to Genoa, or the neighborhood of Geneva, or even the most ornamented parts of the valley of the Thames above London." This fine country was given up to all the horrors of ancient warfare, "and 20,000 persons, many of them doubtless of the highest condition, and bred up in all the enjoyments of domestic peace and affluence, were carried away as slaves." Duréau de la Malle, criticizing Heyne's supposition that the Punic wars and the final destruction of Carthage must have thrown an enormous mass of Carthaginians and Africans into Italy as slaves, observes that there were regular exchanges of prisoners in the first two of those wars, with rare exceptions, and that the rivalry of the two republics was so deadly that it forbade the making of many prisoners, public law being barbarous; and that the earth of Africa and Italy received far more of dead than their fields and cities of slaves. If, he asks, "the Carthaginian or African slaves had been so numerous in Italy, how happens it that their ethnic names should be so rare in the comedies of Plautus, which were represented in great part during

the second Punic war, and that they are not found in those of Terence, himself an African, and a contemporary of the conqueror of Numidia and of Carthage? Among the names from countries given to slaves in these dramas we find those of Syrus, Syricus, Syra, Geta, Cappadox, and Messenio, but never those of Pœnus, Afer, or Numida." He quotes Pignorius, *De Servis*, to show that in the list of ethnic names given to slaves among the Greeks and Romans, there is not a Punic or an African name to be found. The objection is ingeniously put, but it cannot be allowed to weigh against known historical facts, and few things are better established than that the Romans did sell large numbers of captives made in the Punic wars; and it is well known that Roman slavery began to assume its great proportions in the same age that saw the beginning of its long quarrel with Carthage, which opened in 264 B. C. "In the 6th century of the city," says Merivale, "it is not to be supposed that the slaves bore any large proportion to the free population of Italy. The cultivation of the soil was still performed for the most part by free labor, and servile hands were chiefly employed in menial attendance upon the wealthier classes, and in some kinds of handicraft and professions. Slaves were obtained as yet generally by war, but the selling of the conquered masses into slavery was comparatively rare, and reserved for cases where the greatest severity was required. The number, however, both of slaves and foreigners was undoubtedly more considerable in the Hellenic cities of Magna Græcia." Most of the captives taken at the conquest of Carthage, and who had surrendered, were sold into slavery. This treatment of the Carthaginians, a high-bred and refined people, shows the character of Roman slavery, which was not confined to the barbarous races, or to this or that peculiar people, but swept all within its nets who could be conquered by the sword or purchased. Corinth, one of the richest and most luxurious cities of Greece, was destroyed at the same time with Carthage, and the Corinthians were all sold into slavery; and nothing but the influence of Polybius with the younger Scipio Africanus prevented the entire population of Peloponnesus from sharing their fate. Two generations earlier, Capua, a city in no respect inferior to either Carthage or Corinth in culture, the wealth and magnificence of which were proverbial, and which had aspired to the place it was supposed would be made vacant by the destruction of Rome through the expected success of Hannibal, had many of its best citizens sold into slavery, their wives and children being also thus sold; "and it was especially ordered that they should be sold at Rome, lest some of their countrymen or neighbors should purchase them for the purpose of restoring their liberty." After the close of the second Punic war, the conquests of Rome went on with great rapidity, and the numbers of the slave popu-

lation increased at the same rate, so that in 70 years even the free agricultural population of Italy had mostly disappeared, as we learn from the words of Tiberius Gracchus when he began the work of agrarian reform. The absorption of small freeholds in large estates, along with war, led to the decrease of that population, and the places thus made vacant were filled by the purchase of slaves, the latter being taken in war to a considerable extent, though the slave traders were by no means idle. One of the consequences of the successes of Paulus Æmilius in Macedonia was the sale of 150,000 Epirotes, who had been seized because their country was friendly to Perseus. The demand for slaves became very great full two centuries B. C. in Sicily, which had then fallen completely under the Roman dominion, and because corn was much wanted in Italy, then beginning to recover from the effect of the Carthaginian invasion and occupation; and the state of things that prevailed in Sicily was so favorable to the aggregation of wealth, that it soon extended to Italy, where the land passed into the hands of the few. Great estates succeeding to the many small farms that had been known in the preceding generations, the soil was now cultivated or attended to by great masses of slaves, the property chiefly of the leading members of the *optimates*, or the high aristocratical party. The wars in Spain, Greece, Illyria, Syria, and Macedonia, furnished large numbers of slaves, the common sorts of whom were sold at low rates, and who were employed in the country. Nor was the urban population of a much different character, if we can believe an anecdote told of the younger Africanus. Having publicly declared that Tiberius Gracchus was rightly put to death, the people shouted against him, whereupon he exclaimed: "Peace, ye stepsons of Italy! Remember who it was that brought you in chains to Rome!" The invasion of the Roman territories by the Teutones and Cimbri, which ended in the total defeat of those barbarians by Marius, added considerably to the number of slaves, 60,000 of the Cimbri alone being taken captive in the last great battle of the war. The conquests of Sylla, Lucullus, and Pompey in Greece and the East, actually flooded the slave markets, so that in the camp of Lucullus, in Pontus, men were sold for 4 drachmæ each, or about 62 cents of our money. Cicero sold about 10,000 of the inhabitants of Pindenissus. The Gallic wars of Julius Cæsar furnished almost half a million slaves; and Augustus sold 36,000 of the Salassi, nearly a fourth of whom were men of military age. In that war which ended in the destruction of Jerusalem, 90,000 persons were made captives. "Both civil law and custom," says Blair, "forbade prisoners taken in civil wars to be dealt with as slaves; yet the rule was sometimes disregarded. Brutus proposed to sell his Lycian captives, within sight of the town of Patra; but finding that the spectacle did not produce the effect he ex-

pected on the inhabitants, he quickly put an end to the sale. On the taking of Cremona by the forces of Vitellius, his general Antonius ordered that none of the captives should be detained; and the soldiers could find no purchasers for them. The latter fact shows the general feeling on the subject, and is not weakened as a proof by the apparent disposition of the troops; for the spirit of parties was at that time peculiarly acrimonious, and Cremona had made so obstinate a defence that some signal vengeance might be thought due. Prisoners often suffered by their being thus of no value. In the instance just mentioned, the soldiers began to kill them if not privately bought off by their friends; and in the earlier civil commotions captives were openly massacred by Sylla and the triumviri, which perhaps would not have been done to the same extent had their persons been salable." But Roman slavery would not have been of so comprehensive a character as it was if the Romans had been compelled to rely solely upon war for slaves. Commerce, more than war, has been the chief means of feeding slavery from the beginning of the world, and without its aid even war could not have accomplished half its work. Extensive as were the conquests of the Romans, there were portions of the world to which their eagles never reached, or from which they were driven back, or willingly retired; and yet from those countries they procured slaves. Before they had obtained dominion over Italy, they were slave purchasers from the Carthaginians, who drew their chief supplies of men from the interior of Africa, the slave trade of that region, like that of Asia and Greece, being much older than history. There were many slaves obtained by commerce from the East, and the cities on the shores of the Euxine were among the chief slave marts of antiquity far down into the days of the empire. Barbarians of whom the Romans otherwise knew nothing found their way to the imperial city as slaves, who had been purchased far beyond the bounds of civilization, and passed from dealer to dealer until they reached the best market. Asia and Africa contributed most slaves to Rome, but the various European countries were represented in her servile population. At the height of her power she had slaves from Britain, Gaul, Scandinavia, Sarmatia, Germany, Dacia, Spain, the different countries of Africa, from Egypt to the Troglodytes of Ethiopia, the western Mediterranean islands, Sicily, Greece, Illyria, Thrace, Macedonia, Epirus, Bithynia, Phrygia, Cappadocia, Syria, Media, and almost every other country to which ambition or avarice could lead the soldier or the trader to penetrate. None were spared, but all races furnished their contributions to the greatest population of slaves that ever existed under one dominion, from the most cultivated Greek to the most stupid Cappadocian. Unlike the Greeks, the Romans "acknowledged the gen-

eral equality of the human species, and confessed the dominion of masters to flow entirely from the will of society;" but this did not prevent them from enslaving all men upon whom they could lay their hands, while they were much more harsh toward their slaves than the Greeks were; and this may have been the consequence of their opinions on the subject, as they must have expected violent opposition to a system which they admitted to be founded on a disregard of natural right, and therefore sought to break the spirit and to lessen the power of the oppressed. The views on the subject of slavery that prevail in the modern western world would have been incomprehensible to the Romans. Not a few slaves were procured by kidnapping persons, and it was notorious that even Roman freemen were seized and shut up in the *ergastula* of the great proprietors, which invasion of personal rights the whole power of the government was unable to prevent. Children were sometimes sold into slavery by their parents, either from love of gain, or to save them from starvation; and the number of these sales was large in times of general distress. They were also sold for debts due to the imperial treasury. Under a variety of circumstances, poor people could sell themselves into slavery, but such sales were not of an irrevocable character until the 2d century of the empire, and then the law was somewhat limited, the object being to punish those persons who had sold themselves with the intention of reclaiming their freedom, the purchaser in such cases having no redress. Romans who had committed crimes that were ignominiously punished became slaves through that fact, and were known as *servi pœnæ*, or slaves of punishment, and were public property. They remained slaves even if pardoned, unless specially restored to citizenship; and it was not until the reign of Justinian that this form of slavery was abolished. In early times, persons who did not give in their names for enrolment in the public force were sold into slavery, after having been beaten; and incorrect returns to the censors led to the same punishment. Poor thieves, who could not make a fourfold return of the amount of their booty, became slaves to the party stolen from; and a father could give up a child who had stolen to the prosecutor. Poor debtors were sold as slaves.—The employments of Roman slaves, both public and private, were very various, and were minutely subdivided. Beside filling all the more menial offices, many of them occupied the positions of librarians, readers, reciters, story tellers, journal keepers, amanuenses, physicians and surgeons, architects, diviners, grammarians, penmen, musicians and singers, players, builders, engravers, antiquaries, illuminators, painters, silversmiths, gladiators, charioteers of the circus, &c. Before a slave could become a soldier he was emancipated, and into the Roman armies of the early republic not even freedmen were allowed to enter; but the de-

mand for soldiers did away with this delicacy, and slaves were regularly enlisted in the second Punic war, and did good service to the state. The military calling, however, is hostile to servility of condition everywhere, and enlisted slaves could no longer be slaves; and though even recruits were in theory confined to the infantry, we know that they were admitted among the cavalry in the army of the aristocratical party in the contest that decided the fate of Rome at Pharsalia. In the later days of the empire the emperors compelled the proprietors of slaves to furnish recruits from their number, as in Russia the czar has been in the habit of taking serfs from the estates of the Russian nobles to convert them into soldiers, who thus became free. "No slave," says Blair, "could hold a public office, and many lawyers have thought that if a person truly a slave should attain such a place, all his acts would be null. We are told that a slave named Philippus was made prætor, and it has been a fertile subject of dispute whether his decisions were valid; but, whatever may have been the older view of the irremediable incapacity of a slave so situated, Ulpian seems to suggest the more practicable rule, that the acts performed by such a slave, while he was reputed to be a freeman, should be legally good; and that, at all events, the will of the people formerly, and of the emperor afterward, might empower a slave to act in a capacity like this." The number and variety of the employments held by slaves, and the high and confidential character of many of them, coupled with the immense amount of the whole servile population, implies a greater extent of the servile state than ever existed in any other country, and which is altogether unlike what is known in modern times, even where slaves are most numerous, and where their employments are most diversified. Many of the Roman slaves were on the most intimate terms with their masters, and must have been well treated, or the state of society would have been intolerable; and we read of not a few instances in which the lives of masters were saved by their slaves, in the times of the proscriptions and massacres of Sylla and Marius, and of the triumvirs, and on other occasions. Some of the slaves were regarded as being the friends of their owners, and the relations between the parties were of the most pleasing character. But the masses of the slaves were treated harshly, and the laws and regulations affecting them were mostly characterized by severity. The Romans were generally hard masters; and "the original condition of slaves, in relation to freemen, was as low as can be conceived. They were not considered members of the community, in which they had no station nor place. They possessed no rights, and were not deemed persons in law; so that they could neither sue nor be sued in any court of civil judicature, and they could not invoke the protection of the tribunes. So far were those notions carried, that when an

alleged slave claimed his freedom on the ground of unjust detention in servitude, he was under the necessity of having a free protector to sue for him, till Justinian dispensed with that formality." Slaves could not marry even with one another, and they had no power over their children. Few of the ties of blood were recognized among them; and they could hold property only by the sanction or tolerance of their masters. The criminal law was equally harsh, slaves being treated under it as things, but it was gradually meliorated. The severest and most ignominious punishments were shared by slaves with the vilest malefactors, as crucifixion and hanging, and later they were burned alive. "Slavery by birth," says Blair, "depended upon the condition of the mother alone, and her master became owner of her offspring born while she was his property. The mother's state was the rule for that of the child, in so far as regarded persons in bondage, among the Greeks and other ancient nations, and was borrowed from the principle which they naturally assumed with respect to the young of the inferior animals. But the Romans recognized a distinction as to slaves, which does not appear to have been copied from any foreign system. In order to determine the question of a child's freedom or servitude, the whole period of gestation was taken into view by the Roman jurists; and if, at any time between conception and parturition, the mother had been for one instant free, the law, by a humane fiction, supposed the birth to have taken place then, and held the infant to be free-born. For fixing the ownership of a child, the date of the birth alone was regarded; and the father of a natural child by his bondwoman was the master of his offspring, as much as of any one of his slaves." Under the empire the condition of the slaves was better than it had been under the republic, the general character of the imperial legislation being favorable to them, though there were some exceptions. The emperors were far from pursuing a uniform policy toward the servile class, and some of them even restored cruel laws that had been abolished by some of their predecessors. In theory Roman slavery was perpetual, and to this theory the practice conformed, inasmuch as by no act of his own could the slave become free. Freedom could proceed only from the action of the master. Manumission was not uncommon, and there were numerous freedmen who exercised much influence, as well in public life as in families. Freedom was the reward of good conduct, or of what either the master or the state regarded as such. The ease with which the places of freed slaves could be filled up by new purchases made manumission much more frequent than it would have been under other circumstances. Dying masters freed slaves by the hundred, in order that they might swell their funeral processions. On joyful occasions a wealthy master would manumit many of his slaves. Sometimes slaves were

liberated in the article of death, in order that they might die in freedom. Manumission was often the result of agreement between masters and slaves, the latter either purchasing freedom with money, or binding themselves to pursue certain courses that should be for their former owner's interest. The republican period was favorable to emancipation, and freedmen were so numerous at the formation of the empire that some of the early emperors sought to restrict manumission, less however to promote the interest of slaveholders, or to increase the number of slaves, than for the purpose of increasing the numbers of the ingenuous class, an object much thought of and aimed at by several generations of Roman statesmen, but always without success. Later, the emperors favored emancipation, particularly after they had become Christian; and Justinian removed nearly every obstacle to it. Augustus labored strenuously to limit emancipation, but even he had recourse to the society of freedmen, in accordance with a custom of the great men of his country; and in 80 years after his death the Roman world was governed by members of that class of persons. "The slaves of noble households," says Merivale, "were of two very different classes; of which the lower consisted of mere menial drudges, the rude boors of Thrace, Africa, or Cappadocia; while the upper, from Greece and Syria, comprised the polished instruments of fastidious luxury, exquisitely trained and educated, and accustomed by every compliance, however abject, to ingratiate themselves with their sensual and pampered masters. While the former class had little hope perhaps of improving their condition, or escaping, if not prematurely worn out by toil, a neglected and even an abandoned old age, the latter might calculate with confidence on securing their freedom easily, after which they enjoyed a thousand opportunities of rendering themselves as necessary to their patron as they had previously been to their master. The intercourse of the Roman noble with his fellow citizens had been always stiff and ceremonious; community of privilege gave even the plebeian a claim to formal respect from his patrician neighbor; and it was rarely that the ties of confidence and easy friendship subsisted between men so nearly equal in consideration, so often rivals, and always liable to become so. But the Roman magnate wearied of the unceasing round of conventionalities in which he moved, and longed for associates with whom he might unbend in real familiarity, without demeaning himself to the company of mere slaves. The fashion of employing freedmen for the service of the patrician household, and the management of domestic affairs, was first imported into Rome by the conquerors of the East—by Sylla, Lucullus, and Pompey—who were too proud, after enjoying the submission of kings and potentates, to recognize the equality of their fellow citizens." The first Cæsar employed no freedmen, and Tiberius

employed but few, and gave them none of his confidence, thus imitating Julius rather than Augustus; and even Caligula used them but little. Claudius they ruled, and through him the empire. "The greatest friendship," it has been observed, "often subsisted between freedmen and the families and friends of their patrons. Tiro was much esteemed by all who had a regard for his illustrious patron [Cicero]; and Zosimus, the freedman of the younger Pliny, appears to have been treated as an equal by him and by his friends. The freedmen of many of the successors of Augustus wielded all the power of their masters; and the submission with which they were courted may be learned from the servile decree in favor of Pallas, one of Tiberius's freedmen, and perhaps no less convincingly from Seneca's cringing address to Polybius, the freedman of Claudius."—It is impossible to estimate with an approach to accuracy the number of Roman slaves, as the subject is one on which men of learning differ largely. Gibbon thought the number of slaves was equal to that of the free population, which Zumpt pronounces a "gross error;" and Blair estimates that during the 14 generations that followed the conquest of Greece, there were three slaves to one freeman. Gibbon's estimate, which applies to the reign of Claudius, would give 60,000,000 slaves, and probably it is not far from the truth, though we may agree with Blair that it seems much too low for those places which were inhabited by Romans properly so called. Many individuals owned immense numbers of slaves, though the figures in some of these cases are perhaps exaggerated, or the results of the mistakes of copyists. Marcus Crassus was the wealthiest Roman of the last century of the republic, and much of his wealth consisted in slaves, the employment of whom in various ways was to him the source of great profit. He had a regularly organized system of slave labor. Plutarch says: "Though he had many silver mines, and much valuable land, and many laborers on it, still one would suppose that all this was of little value, compared with the value of his slaves; so many excellent slaves he possessed—readers, clerks, assayers of silver, house managers, and table servants; and he himself superintended their education, and paid attention to it, and taught them; and in short, he considered that a master was mainly concerned in looking after his slaves, who were the living instruments of domestic economy." Yet Crassus would have been considered a small slaveholder by some of those of the imperial times, who reckoned the number of their bondmen by thousands. The prices of slaves were not fixed, more than that of other articles. Slaves of luxury, or slaves whose labors brought great incomes to their owners, were of course of very high value. Good doctors, actors, cooks, beautiful women, and skilled artists brought heavy sums, and "ruled high;" and so did handsome boys, eunuchs, and fools. Learned men,

grammarians, and rhetoricians, also sold at high rates. Some descriptions of artisans and laborers would sell at good prices, upward of \$300 of our money each; but \$100 was a fair average price for a common slave, and when a slave could be bought for about half that sum the price was held to be low. Prices varied with circumstances, and after a successful war, in which many captives had been made, there would be a glut in the slave market, and men, women, and children could be obtained easily.—Slaves being so numerous in Rome, composed of members of the best races of antiquity, including persons of the highest order of intelligence then known among men, and often badly treated, insurrections and servile wars were not uncommon. Two such wars broke out in Sicily after the conquest of that island by the Romans, and were extinguished only in the blood of myriads of men, and through the exertions of consular armies. Toward the close of the 7th century of Rome the war of the gladiators, waged on the one side by slaves alone, from general to camp servants, brought the republic to the verge of ruin. The war was commenced by a few gladiators from the schools of Capua, under the lead of Spartacus, a Thracian, 73 B. C., and lasted for more than two years. Several Roman armies, commanded by prætors and consuls, were defeated, and for a time the revolted slaves had the peninsula more at their command than it was at the command of the Romans. The country was horribly ravaged, and it was not until Crassus took the field, and 200,000 men were employed, that the rebellion was subdued; and the final battle was won by the Romans more as the consequence of the death of Spartacus before it was half fought than from their superior generalship. Six thousand of the slaves were hanged or crucified after their defeat. The punishment of rebellious slaves was always very severe. Many slaves had enlisted under Sextus Pompey, and thousands of them who fell into the hands of Augustus were by him sent to the horrible death of the cross, with the general approbation of the citizens. They were crucified solely as fugitives, as all whose masters could be found were restored to them; and the cruel act was perpetrated in violation of plighted faith. It more than once happened that Roman leaders in the civil wars either called upon slaves to rebel, or availed themselves of the services of slaves. Marius, on his return from Africa to Italy, and just before his death, proclaimed liberty to all slaves who would join him, and at least 4,000 enlisted under his banner. Before his exile he had tried the same plan, but without success. The Cornelians of Sylla were 10,000 freed slaves, who had belonged to members of the Marian party that had been proscribed by the conqueror, and who took their appellation from the gentile name of their patron. Catiline had intended to avail himself of the aid of slaves.—The slave trade of antiquity was very great, and comprehended

the whole world in its circle. Its origin is unknown, for we find it practised in all its parts at the earliest period of which any knowledge is to be obtained. Gurowski expresses the opinion that the Phœnicians in their wanderings "most probably began the traffic in slaves, to which, if they were not its originators, they certainly gave a new and powerful impulse." There is nothing intrinsically improbable in this, if we could establish the date of the commencement of the traffic, and if the Phœnicians could be shown to have been then in existence; and that they increased the trade, and systematized it, it is easy to believe, for of all peoples they were the most addicted to commerce. But the trade must have been in existence, with distinct laws and regulations for its government, before even that antique mercantile race was known among men. The Phœnician slave trade was very extensive, and supplied in part by piracy. They stole Greeks and sold them 12 centuries B. C., and they also sold stolen people to the Greeks. They had a land traffic in slaves, obtaining them in the countries between the Black and Caspian seas. "Cappadocia, together with the Caucasian districts," says Heeren, "from the very earliest times, was the chief seat of the slave trade, and always continued so in the ancient world. The finest race of men have always been preferred; and it is very generally known that at the present time the harems of the Turkish and Persian nobility are peopled with the most beautiful of the Georgians and Circassians. The speculating spirit of the Phœnicians soon found a way to these countries, and know very well how to take advantage of the prevailing taste in this merchandise. Their commerce in this detestable branch of trade was very extensive. The prophets bitterly reproach them with dealing in boys and girls, even in those of their neighbors the Jews, and for selling them to the Greeks; and predict that they should be punished for this offence, and their own children sold to the Sabæans." The Phœnicians also obtained slaves from the N. shore of the Euxine; and they exchanged Jewish slaves for the productions of Arabia with the Sabæans and Edomites. The Greeks were also great slave traders, and were as skilful in kidnapping persons as were the Asiatic race. Their slave traffic extended to Egypt, Thrace, Phrygia, Lydia, Syria, and other countries. From Egypt they obtained blacks, then regarded as slaves of luxury. Their slaves came from the north and the east mostly, while the west furnished few or none. The chief slave marts in Greece and the Grecian islands were Athens, Samos, and Chios; and next to them, but in or near Asia, were Ephesus and Cyprus. The Carthaginians, who were the Phœnicians of the west, rivalled their progenitors in the extent and comprehensiveness of their slave traffic. They had an immense traffic with the interior of Africa, a caravan trade, like that of the Egyptians and of the Cyrenæans. Women were preferred

to men in the trade with the African slave dealers, as they sold for much higher prices in some northern countries. There was a large demand for negroes in the Balearic islands, and especially for women. Corsica also furnished many valuable slaves to the Carthaginians. The Roman slave trade as much exceeded that of any other country of antiquity as the institution of Roman slavery exceeded slavery in other countries. It was on the same gigantic scale that marked all the proceedings of the Romans, whether for good or for evil, from the time that they began to be owners of slaves in large numbers, and slave labor steadily to supplant free labor, that is to say, from about 200 B. C. Under the demand of the conquering race for slaves, the trade in them grew to an enormous height, and was fed by war, by kidnapping, and by commerce with distant tribes. In remoter times the Romans were no better than robbers in their treatment of foreigners, they imitating the Etruscans in this respect, who were the worst pirates of antiquity, and were by no means the less esteemed on that account. Corinth had been the chief slave mart of Greece toward the close of its independence, before it fell into the hands of the Romans, and at the time when slavery was beginning to increase rapidly in Italy; and it is supposed, its situation being favorable to trade of the kind, that many slaves were sent thence from the East to the cities on the eastern Italian coast. But the destruction of Corinth by the Romans, 146 B. C., transferred the slave trade to Delos, which became the most noted slave market of that age, though the trade in slaves was but one branch of the immense commerce that centred there. The importance of the slave trade in that classic island was owing to the Roman demand, as it was most favorably situated to minister to the desire for slaves from eastern countries—Greeks, Syrians, Phrygians, Bithynians, and others. According to Strabo, it was possible, so complete were the arrangements, to import 10,000 slaves in one day, and to export them on the same day. But all this prosperity came to an end when the forces of Mithridates entered Greece. They landed on Delos, and devastated the island, and it never recovered from their ravages. The Mediterranean pirates had supplied Delos with many slaves; and at Side they had a great market of their own, at which they disposed of their captives, many of whom were captured far inland, even Italy itself not being safe from their ravages, and its villas and highroads furnishing victims to the marauders, who became all-powerful during that disturbed period of Roman history in which occurred the social war and the contest between Marius and Sylla. From Alexandria the Romans obtained slaves, Egyptians and Ethiopians, that city having a great trade in men. Others were drawn from Thrace, which continued to be a slave-breeding country long after the fall of Greece. After the devastation of Delos, the slave trade fell back nearer to its sources, and

the Romans obtained slaves direct from the marts on the Euxine sea, where the trade had existed from time immemorial, being fed by the constant warfare that was waged by the neighboring tribes. Many came from Scythia, and Scythian and slave were all but convertible terms. The Galatians carried on an extensive slave trade; and between Italy and Illyria this commerce was considerable in the first days of the empire. From Gades (Cadiz) came the most admired female singers and dancers. There were some slaves from Britain, but the number must have been limited until after the fall of the republic. The Roman wars fed the slave trade, and enabled those who carried it on to accumulate immense fortunes. So long as those wars were fought near home, the victors could sell their captives easily, without much aid from traders; but as soon as they extended to any distance from Italy, the trader's aid became necessary, and was richly rewarded. The trader followed the camp, and in the camp the human booty was sold, and often at prices so low as to appear incredible. In the camp of Lucullus, after his Pontine victories, men could be bought for about 75 cents each, and were worth as many dollars in Rome. The profits therefore were vast. "Rome," says Wallon, "was the grand centre of consumption; it was to Rome that slaves came from every battle field, and from all the markets of the world, to be spread through all the callings of town and country life; and, before having arrived there, they had been made to pass through more than one hand, and to make more than one fortune, for in so vast a commerce speculations of every kind abounded." Not a few of the slaves obtained from the barbarous tribes were got cheaply and by barter, as in modern times negroes have been bought in Africa at prices scarcely more than nominal. The Romans never interfered with the slave trade, which was allowed to pursue its own course. They neither encouraged nor discouraged it. The trade was so lucrative, and the demand for slaves was so sure, that it required no legislative assistance to secure supplies of slaves. In all countries slave trading has been held in disrepute, and nowhere is the slave dealer so much despised as in slaveholding communities. The Romans were no exception to this rule. They held the slave trader in contempt, and deemed his business utterly unworthy of merchants. Special names were given to such traders, implying that they were necessarily cheats; but their enormous wealth made them powerful, and they were able to maintain themselves, not only through their wealth, but because their services were so much in request. The estimation in which they were held was deserved, for they were systematic swindlers, and the severest regulations could not prevent frequent impositions on their customers.—Slavery is regarded as having been one of the chief causes of the decline of Rome. The institution exist-



ing in all parts of the Roman empire, it continued to prevail in the countries which were formed from its fragments, though essentially modified by a variety of circumstances. The influence of Christianity upon it was very great, and of a meliorating character; but it still prevailed, and was fed by conquest and commerce. It had indeed existed before the extension of the Roman dominion, and was known to most of the peoples who invaded and overthrew the empire. The rise of the Saracens tended to increase the number of slaves, and to feed the trade in them, as Christians felt no scruples about enslaving Mussulmans, and the Mussulmans were quite as unscrupulous toward Christians. The wars between the Germans and Slavi furnished so many of the latter race for the market, that the word slave is derived from them. The mighty commercial republics of Italy were much engaged in slave trading. In spite of the efforts of the popes, the Venetians sold Christians to Moslems. "Commerce in men," says Daru, "was long followed by the Venetians, notwithstanding the exertions of the church. The humanity of Pope St. Zachary is mentioned, who redeemed many slaves sold by them to the Mohammedans. In the 9th century legislation sought to put an end to this odious traffic; but in principle it was considered in the interest of religion. It was not the trade in men that excited the indignation of legislators; and, as they traded in Christians as well as in infidels, it was the sale of Christian slaves to the latter that they sought to suppress." This legislation was not very successful, though it was often resorted to. The Venetians had many slaves, and the history of their commerce shows that they pursued the slave trade with vigor and profit. Slavery also existed in Florence, though the slaves were almost exclusively Moslems and other unransomed prisoners of war. "We find the traces of slavery running among the Florentines," says H. E. Napier, "through all this [the 15th] century, and far into the next; this stain indeed seems never to have been wiped out by any legal enactments of the Italians, but rather to have been gradually relinquished from the united influence of liberal institutions, increasing civilization, and private interest. Free labor was found more profitable, and all field slavery fell early into disuse; but among the Florentines domestic slaves, though perhaps not universal, were by no means uncommon." The conquest of England by the Saxons introduced complete slavery into that country, more severe than that which it had known under the Romans. The slave trade flourished, Bristol being the chief mart, whence many slaves were exported to Ireland. The Norman conquest increased slavery, the conquered Saxons, even the nobles, becoming in fact slaves. In Ireland slaveholding was never very popular, and the Irish early emancipated their bondmen.—At the close of the middle ages, two peculiar forms of slavery and the slave trade be-

gan to be known, one of which has but recently ceased to exist, while the other is yet powerful and continues largely to influence human affairs. The new phase of Mohammedanism that came up with the rapid development of the power of the Turks, in the 14th and 15th centuries, nearly synchronizes with the origin and progress of what is known specifically as negro slavery. The Turks completed the establishment of their power in Europe by the conquest of Constantinople in 1453; and not quite 40 years later the Mussulmans of Spain were conquered by the Christians of that country, Granada falling into the hands of the Spanish sovereigns in the early days of 1492. These two events had a remarkable effect on slavery. The fears of Christendom were excited by the rapid and sweeping successes of the Turks, and the anger of the Mussulmans was roused by the overthrow and enslavement of their brethren in Spain; and from these feelings the system of slavery received an impetus and acquired forms that under other conditions it never could have known. We have seen that the church, at a much earlier period, did not object so much to the traffic in men as to the traffic in Christians, and that lay legislators took the same view of human duties; and it was also the case that the selling of Christians to Moslems was more strictly forbidden than was the selling of Christians to other Christians. The sentiment that prevailed while the Saracens were so strong as to excite fears throughout all Christendom for its safety, was revived in the 15th century, and did not become altogether extinct until toward the middle of the 17th. There was a grand duel fought between Christianity and Islam, the principal scenes of which were the Mediterranean and its shores. In the East, and for the greater part of the time in most of N. Africa, the Mohammedans were in the ascendant, they having become masters of Barbary and lords of the Levant. The Christians had possession of the countries to the west, including Spain and Italy, and a portion of the Greek islands. It was between the Turks on the one side and the Italians and Spaniards on the other that the long struggle was principally carried on in the south, the English being too remote from the scene to take much part in it, while the French, though occasionally furnishing some gallant volunteers, were as a nation the friends and sometimes the allies of the infidels. The knights of St. John of Jerusalem, first in Palestine, then at Rhodes, and afterward at Malta, carried on perpetual warfare with the Mussulmans. The contending parties divided between them the whole of the sea dominion of the Romans, and as the wars of that people had singularly contributed to the increase of the number of slaves, and had driven innumerable members of the best races of antiquity into the slave trader's toils, so did the modern compound rivalry of religion and race in the same field cause multitudes of some of the foremost peoples of the time when it occurred to

become reduced to the state of slavery. Men who were taken in war did not alone compose these slaves, among whom were many women and children, the victims of *razzias* that were undertaken by the parties to the bitter and prolonged contest that was then and there waged. The light, low vessels of the Mussulmans often ran into the ports of the Spaniards and Italians by night, and they were given up to plunder and the flames, while the inhabitants were either murdered or carried into captivity. Watch towers were built along the coasts, to enable the approach of the corsairs to be detected, the ruins of many of which are yet to be seen. So marked a feature of the war then waged was this form of slavery, that it furnished much matter for the romantic literature of southern Europe, in which nothing is more common than incidents connected with bondage in Barbary. "The cruel wars unceasingly kept up with the Barbary powers," says Professor Ticknor, "and the miseries of the thousands of captives who returned from Africa, to amaze their countrymen with tragical stories of their own trials and those of their fellow sufferers, were full of that bitter romance of real life which outruns all fiction." The same authority, speaking of the *Selva de aventuras*, says: "It is of some importance, because it is the first in a class of fictions, afterward numerous, which—relying on the curiosity then felt in Spain about Italy, as a country full of Spaniards enjoying luxuries and refinements not yet known at home, and about Algiers, crowded with thousands of other Spaniards suffering the most severe forms of captivity—trusted for no small part of their interest to the account they gave of their heroes as adventurers in Italy, and as slaves on the coast of Barbary. Lope de Vega, Cervantes, and several more among the most popular authors of the 17th century, are among the writers of fictions like these." Numerous dramas were founded on the cruel condition of the Christian Spaniards in Algiers, a place which abounded in captives taken from Europe. Cervantes himself was for 5 years an Algerine captive, and he formed a project for a slave insurrection, there being 25,000 enslaved Christians at that time in Algiers alone. Enormous numbers of captives were employed as rowers of galleys, Christians on board those of the Mussulmans, and Mussulmans on board Christian vessels. When the Turks lost the battle of Lepanto, in 1571, not fewer than 12,000 Christian captives, galley slaves, were released from the prizes made by the allied fleet. As the number of Mussulmans captured was probably as great as the number of Christians, some idea of the extent of this peculiar branch of slavery may be had from these two facts. When Charles V. took Tunis, in 1535, 20,000 Christians were released from slavery. The Barbary corsairs imitated the actions of those pirates who, 16 centuries before, had so seriously annoyed the Romans; and as a noble Roman

lady had been seized by the pirates while travelling in the country far inland, so did Barbarossa, the greatest of the corsairs, form a plan for the seizure of the countess of Fondi, considered the most beautiful woman of her nation, intending to send her as a present to Sultan Solymán the Magnificent; and the plan but just failed of success, the town of Fondi being taken, but the lady escaping. Great numbers of women were taken as slaves, and sold in the slave markets of Turkey and Barbary. The corsairs extended their depredations, and, passing out of the Mediterranean, their vessels sailed far to the north, seizing people on the coast of Ireland. This brought upon them punishment from the English, but that did not put an end to their Atlantic cruising. There were some places in Barbary on the Atlantic from which corsairs sailed, and those of Salé were among the most famous of the brotherhood. The European powers made frequent war on the Barbary states; and of the early contests in which the American Union was engaged none were more brilliant than those which it carried on with some of those states, in defence of the liberty and commerce of its citizens. The jealousies of the European powers, however, prevented them from putting an end to the piracy and slavery of Barbary long after the Turks had ceased to be able to protect the corsairs, and tribute was paid to the petty powers down to the beginning of the 19th century. The successful bombardment of Algiers in 1816, by an English fleet commanded by Lord Exmouth, put an end to white slavery in Barbary, it having previously ceased to exist in the other countries of N. Africa, to which the exploits of the American navy had much contributed, though at first the government of the United States had paid tribute to the pirate chiefs.—At the same time that slavery was acquiring its peculiar form in the countries on the Mediterranean, negro slavery—or African slavery, as it is generally termed—came into existence, and increased to those great proportions which it has maintained until the present time. This form of slavery belongs entirely to modern times. As we know, the slave trade in negroes existed 3,000 years ago at least, and the Carthaginians brought numbers of black slaves from central and southern Africa, by means of their caravan commerce, a mode of traffic that was common long before the Carthaginians had a political existence; but in trading in negroes, the slave traders of antiquity did that only which they did with all other descriptions of men, and as the slave traders of the East have always done until now. The ancients regarded black slaves as luxuries, and that they were so looked upon proves that their number could not have been large in the European countries to which they were taken, either by the way of Egypt or that of Carthage. Such facts as we have concerning the black slaves of antiquity all serve to show that they were not

numerous, far less so indeed than were slaves belonging to some of the highest of the white races. They were probably more numerous in the East than in Greece and Italy; and most numerous of all in Egypt and the countries of N. Africa, because of the comparative ease of acquiring them in those countries. The Venetians, who carried on a large trade with Africa, no doubt distributed some negro slaves over the various European nations which they visited. In the Mohammedan countries there have been black slaves from the time of the prophet, and they have often in those countries risen very high, as well in the state as in the household. But in all these cases the negro has but shared the common lot, and might have been sold on the same day with the Greek or the Arab, and by the same trader. As slavery existed among the negroes themselves, and in the severest form, it is not unlikely that most of their number who were sold abroad were benefited by the transfer of their persons to foreign masters. The negro was then sold, not because he was a negro, but because he was a man, whose services could be turned to profitable account. Negro slavery is one of the consequences of that grand movement in behalf of maritime discovery and commerce which began in the 15th century, and which is still going on, though its original force is much lessened because of there being so few fields for the display of its action. Portugal took the lead in this movement, which had become prominent more than 4 centuries ago; and it was headed in that country by Prince Henry, third son of John I. He began his labors about 1418, 3 years after the capture of Ceuta in Africa, at which he was present; and it was in Africa that he became acquainted with travellers on that continent, from whose conversation he inferred that it did not terminate at Cape Non, and that it would be desirable to attempt discoveries along its western shore, and so penetrate to the Indies. In 1441 two of Prince Henry's captains seized some Moors, who were taken to Portugal. The next year these Moors were allowed to ransom themselves, and among the goods given in exchange for them were 10 black slaves, whose appearance in Portugal excited general astonishment, and who led the van of the African slave trade. This was openly commenced in 1444, by a company formed at Lagos; and though it is doubtful whether that company was formed expressly to trade in men, and it is by no means certain that the 200 persons whom its agents seized and brought to Europe were negroes (Prince Henry accepting his fifth of the number), it is from that time that the negro trade is generally dated. The first negroes taken by the Portuguese in the negro country were but 4 in number, in 1445, and they were rather taken accidentally, as it were, than of set purpose and to make them slaves; but the trade in negroes as slaves was quickly regulated, and a Portuguese factory was es-

tablished in one of the islands of Arguin, about the middle of the 15th century, where the slave trade had previously been commenced. Every year 700 or 800 black slaves were sent from this factory to Portugal, while other slaves of the same description from the countries that furnished those sent to Portugal were sold to other traders, who took them to Tunis and to Sicily. But this commerce was not extensive, and Prince Henry and those who followed in his path did not regard the trade in slaves as a thing to be encouraged. They thought rather of the conversion of the Africans to Christianity, both the Portuguese and Spanish discoverers being enthusiastic propagandists. Had it not been for the discovery of America, in 1492, it is altogether probable that the African slave trade would never have exceeded the dimensions it had known in antiquity; and it is believed that between 1455 and 1492 that trade had fallen off considerably, and that the number of negroes taken by the Portuguese for exportation did not exceed 800 or 400 a year. In fact, Europe presented no field for the labor of black slaves, the employment of which must have been confined to the houses of the great, as in the classic times, with rare exceptions. The negro trade therefore did not pay, and was verging to extinction, when the success of the great enterprise of Columbus imparted to it new life, and made it one of the most lucrative branches of commerce, a position which it has ever since maintained. Soon after the discovery of America the Spaniards began to enslave the natives, large numbers of whom were sent to Spain as slaves in 1495. The system of *repatriamientos* was begun in 1496. Columbus appears to have had no scruples on the subject, and had indeed been engaged in the Portuguese slave trade. He strongly recommended the trade in the cannibal Indians; and the Spanish sovereigns, though in general their legislation was of a kindly character toward the natives, did not discourage his proposition. At a later period Isabella sought to make a distinction between Indians who had been sold into slavery after having been taken in war, and others who had been seized in consequence of failure to pay tribute; and she was very angry with "the admiral" for having made the seizure, and ordered the sufferers to be released and returned to America. Under the Spanish rule the Indians perished in immense numbers, until they became extinct in the islands, or were absorbed by the other races. Slavery itself was not unknown in America, and had a well defined system in Mexico, the most advanced of all American countries, except Peru. "The most remarkable part of the Aztec code," says Prescott, "was that relating to slavery. There were several descriptions of slaves: prisoners taken in war, who were almost always reserved for the dreadful doom of sacrifice; criminals, public debtors, persons who from extreme poverty voluntarily resigned

their freedom, and children who were sold by their parents. In the last instance, usually occasioned also by poverty, it was common for the parents, with the master's consent, to substitute others of their children successively as they grew up; thus distributing the burden as equally as possible among the different members of the family. The willingness of freemen to incur the penalties of this condition is explained by the mild form in which it existed. The contract of sale was executed in presence of at least 4 witnesses. The services to be exacted were limited with great precision. The slave was allowed to have his own family, to hold property, and even other slaves. His children were free. No one could be born to slavery in Mexico; an honorable distinction, not known, I believe, in any civilized community where slavery has been sanctioned. Slaves were not sold by their masters, unless when these were driven to it by poverty. They were often liberated by them at their death, and sometimes, as there was no natural repugnance founded on difference of blood and race, were married to them. Yet a refractory or vicious slave might be led into the market, with a collar round his neck, which intimated his bad character, and there be publicly sold, and, on a second sale, be reserved for sacrifice." No such system as this was known in any other part of America. The desire of the Spaniards to have laborers, and the inability of the natives to perform the labors required of them, soon led to the sending of negroes to the new world. Interest and humanity promoted their rapid increase in the Spanish colonies. They could perform the work to which the Indians were unequal, and thrive under it. The government of Ferdinand feared that the sending of many negroes to America would prove injurious, but his successor Charles I. (the emperor Charles V.) granted a license to a Fleming to import negroes into the West Indies. Thenceforth the trade went on vigorously. The demand of the colonists for negroes was supported by the benevolent Las Casas, and by other leaders in the Catholic church, who were desirous of preventing the extinction of the Indians. One negro was counted as worth 4 natives. There was a negro insurrection in Hispaniola as early as 1522. The African slave trade, under such stimulus as was afforded by the American demand, rapidly increased, and England took part in the work of supplying the Spaniards in 1562, previously to which negroes had been landed in England, and there sold, in 1553. Queen Elizabeth is charged with having shared the profits made by Sir John Hawkins, the first Englishman who commanded a regular slave trader. The English were far more cruel traders than the Portuguese. In the times of the Stuarts 4 English companies were chartered for the purpose of carrying on the African slave trade, and Charles II. and James II. were members of the fourth company. While duke of York, James II. was

at the head of the last company. After the revolution the trade was thrown open to all; and at later periods the royal African company received aid from parliament. These companies furnished negroes to America; and in 1713 the privilege of supplying them to the Spanish colonies was secured to Englishmen for 80 years, during which 144,000 were to be landed. The French, the Dutch, and other European nations engaged in the traffic; and the first slaves brought to the old territory of the United States were sold from a Dutch vessel, which landed 20 at Jamestown, in Virginia, in 1620. The culture of cotton began the next year. Slavery soon came into existence in nearly every part of North America, and Indians were enslaved as well as negroes. The son of King Philip was sold as a slave. The trade between North America and Africa was carried on with considerable vigor, and it is estimated that 300,000 negroes were brought hither prior to 1776. Some of the colonies remonstrated against the trade, but without success, as the mother country encouraged it. In 1776 it was resolved by the continental congress that no more slaves should be imported; but when the American constitution was formed, in 1788, congress was prohibited from interdicting the traffic before 1808, at which time it was abolished. The state of Georgia prohibited the slave trade in 1798. America was thus in advance of other countries in fixing a time for the cessation of a traffic which has been as generally condemned as it has been persistently pursued for 360 years. In England the slave trade was early denounced by individuals, but it was regarded by most men as a perfectly legitimate branch of commerce, in accordance with the common sentiment of those times. The last act of the British legislature regulating the slave trade was passed in 1788, the same year that the first parliamentary movement for the abolition of the trade was made. The Quakers were opposed to slavery and the slave trade from the beginning of their existence as a body, but neither their influence nor their numbers were large. English lawyers were nearly unanimous in their support of the legality of slavery, and the trade in negroes was in various ways encouraged by law. In the 18th century a sentiment of hostility to the system of slavery, never altogether unknown since the Christian era, became very common, and was shared by many literary men, philosophers, and statesmen, who labored with zeal for the suppression of the system. Of these, the most noted was Granville Sharp, who exerted himself for half a century in the emancipation cause; and it was chiefly through his labors that the decision of Lord Mansfield, in the case of Somerset, was given in 1772, that decision being that the master of a slave could not by force compel him to go out of the kingdom. "The power of a master over his slave," the English chief justice of the court of king's bench observed, "has been extremely different

in different countries. The state of slavery is of such a nature that it is incapable of being introduced on any reasons, moral or political, but only positive law, which preserves its force long after the reasons, occasions, and time itself from whence it was created are erased from memory. It is so odious that nothing can be suffered to support it but positive law. Whatever inconveniences, therefore, may follow from a decision, I cannot say this case is allowed or approved by the law of England, and therefore the black must be discharged." "Many expressions and opinions have been attributed to Lord Mansfield," says Mr. Cobb, "which are nowhere included in or inferable from his opinion, but which have been taken from the arguments of counsel, especially that of Mr. Hargrave, written out long after the decision, and which it is not pretended were ever delivered upon the hearing." Lord Mansfield's decision has been greatly overrated as to the importance of its terms, and it is incorrect to say that it was the first of the kind in the order of time. More than 10 years earlier, the admiralty court of Glasgow liberated a negro slave who had been imported into Scotland; and 70 years before, Chief Justice Holt ruled that "as soon as a negro comes into England he is free; one may be a villain in England, but not a slave;" and later: "In England there is no such thing as a slave, and a human being never was considered a chattel to be sold for a price." The decision of Lord Mansfield was made almost under compulsion, so strong was the feeling in England against slavery at that time; and immediately the enemies of both the trade and the institution went to work, and began those exertions which were not to cease until their country had abolished, first the commerce in negroes, and then the practice of enslaving them. Granville Sharp, who immediately after the liberation of Somerset wrote to the British premier, Lord North, "warning him in the most earnest manner to abolish immediately both the trade and the slavery of the human species in the British dominions, as utterly irreconcilable with the principles of the British constitution, as well as of the Christian religion," lived to see the abolition of the trade in negroes by both England and America. The Quakers continued their labors, and presented to parliament the first petition for the abolition of the slave trade. Mr. Clarkson began his anti-slavery labors in 1785, and Mr. Wilberforce joined him soon after. In June, 1787, a committee, composed of 12 members—all Quakers, save Clarkson, Sharp, and another—was instituted for "effecting the abolition of the slave trade." An earnest discussion took place in this committee on the question whether they should direct their efforts against the slave trade alone, or against both the slave trade and slavery. Sharp contended that "it became the committee to exert themselves equally against the continuance of both." To the other members of the committee it appeared that to aim

at the removal of both slavery and the slave trade "would be to aim at too much," endangering success in either. In spite of the care they took to define their object and to conciliate popular prejudice, they encountered the violent opposition of the most eminent men of the country. The duke of Clarence denounced them in the house of lords as "fanatics and hypocrites, among whom he included Wilberforce by name." The subject was brought before parliament, May 9, 1788, but the abolitionists were beaten, as they also were in 1789. Mr. Pitt, chief of the ministry, and Mr. Fox, chief of the opposition, joined them in 1790; and soon nearly all the leading members of the house of commons, of both parties, became abolitionists; but still defeat met every proposition for abolition until 1793, when the commons passed an act for the gradual abolition of the trade, which failed in the house of peers. The commons changed their mind in 1794, but passed another bill the next year, which the peers threw out. The agitation was continued, but the abolitionists failed in parliament until 1804, when another act passed by the commons was lost in the upper house. Another failure in the commons was experienced in 1805. In 1806, when the Fox and Grenville ministry ruled England, abolition was brought forward as a government measure, and was carried in 1807, after the death of Mr. Fox. The abolitionists then began to labor for the removal of slavery itself, but not with much effort until 1823, when a society was formed "for the mitigation and gradual abolition of slavery throughout the British dominions." The principal leaders in this new movement were Mr. Clarkson, Mr. Wilberforce, and Mr. Buxton. About this time appeared a pamphlet, written by Elizabeth Heyrick, a Quaker, and entitled, "Immediate, not Gradual, Abolition." Her views did not at first command the assent of those who controlled the operations of the society, but subsequent reflection and discussion, and the resistance of the colonial authorities to every scheme of amelioration proposed by parliament, finally led them almost unanimously to the conclusion that she was right, and they abandoned the doctrines and measures of gradualism for those of immediate and unqualified emancipation on the soil. The cause from this time advanced with great rapidity. The question exerted a controlling influence in the election of the reformed parliament in 1832, and when, near the close of the year, that body assembled, the government avowed its purpose to bring in a bill for the abolition of slavery. The anxiety of the abolitionists as to the character of the proposed measure led to a conference, composed of 369 delegates from every part of the kingdom. A deputation of more than 300 members of this conference had an audience with leading members of the cabinet, to urge the necessity of total and immediate emancipation. The government measure was brought forward April 23, 1833. It

proposed an apprenticeship of 12 years for the slaves, and to pay out of their earnings to the masters the sum of £15,000,000. The friends of emancipation remonstrated against these features of the plan, and it was finally modified by a reduction of the term of apprenticeship to 6 years, and a provision to pay the masters £20,000,000 out of the national treasury. The bill passed the house of commons Aug. 7, the house of lords Aug. 20, and received the royal assent Aug. 28, 1833. The day fixed for emancipation was Aug. 1, 1834, and it was left optional with the local legislatures respectively to adopt or reject the system of apprenticeship. Antigua and Bermuda rejected, while the other islands adopted the system. The apprenticeship system did not work well. In some instances the local legislatures voluntarily abolished it, and in 1838, two years before the time of its appointed expiration, it was brought to an end by act of parliament. In 1843 Great Britain emancipated more than 12,000,000 slaves in her East Indian possessions. France had been as much committed to negro slavery as England, but moved sooner for its abolition. The national assembly, May 15, 1791, virtually granted equal political privileges to all free men, without regard to color, and this led to those struggles in St. Domingo which put an end to slavery there. Napoleon I. succeeded in restoring slavery in most of the French colonies, but failed in Hayti. In 1815, during the Hundred Days, he issued an order for the immediate abolition of the slave trade, which the government of Louis XVIII. retracted, and the French slave trade ceased in 1819. The congress of Vienna denounced the slave trade. After much discussion in the reign of Louis Philippe, slavery in the French colonies was abolished by the provisional government in 1848, without indemnity to the masters. Sweden abolished slavery in 1846-7, Denmark in 1848, and Holland in 1860. Spain agreed in 1814 to abolish the slave trade in 1820. The Netherlands abolished it in 1818, and Brazil in 1826, but the Brazilians continued to prosecute it notwithstanding. In 1820 the United States passed a law declaring the slave trade to be piracy, but no conviction was obtained under this statute until Nov. 1861, when Nathaniel Gordon, master of a vessel called the *Eric*, was convicted at New York. A similar statute was passed by the British parliament in 1825. "Before these statutes," says Mr. Cobb, "the trade was held to be legitimate by the subjects of all countries not expressly forbidding it, and these statutes do not and cannot make the offence piracy, except in citizens of these respective nations." But the trade by no means ceased because of these vigorous efforts made for its abolition, which Great Britain and the United States supported by the presence of powerful fleets on the coast of Africa. The demand for slaves continued to be great, and the profits on the cargoes of slaves that were landed in various parts of America were so

heavy that the traders could afford to lose many of their vessels. There is also an extensive slave trade on the E. coast of Africa, and Zanzibar is a noted slave mart. Slavery, which prevailed throughout Spanish America, has mostly disappeared since the fall of the dominion of Spain, and where it exists the form of it is very mild. In Brazil slavery is a vigorous institution, but there is no wide distinction in that country between the whites and the blacks. Five sixths of the population are either negroes or persons of mixed blood, and two fifths of these are slaves. The "prejudice of color," which is so common in the United States, is unknown under the imperial government of the Braganças.—The whole number of Africans taken for slaves is estimated at 40,000,000, or not quite 100,000 per annum since the beginning of the traffic; but for 80 years after the trade began, their exportation was very limited, and probably not 80,000 were taken by the Portuguese between 1444 and 1493. The weight of the exportation has been during the years that have elapsed since movements for the abolition of the trade were commenced, the demand for tropical produce having immensely increased in the present century. Some of the slaves were sold in European countries, and it was supposed that there were 15,000 in the British islands at the time of the decision of the Somerset case. African slaves were said to be "dispersed all over Europe." Spain and France took some of them, as well as England. The number of slaves imported into those British colonies which became the United States in 1776, is computed at 800,000 down to that year. At the first census, in 1790, the slaves in the United States numbered 697,897, all the states but Massachusetts (which then included Maine) having some servile inhabitants, though Vermont had but 17, and New Hampshire only 158. In 1800 their number was 893,041, slavery having ceased in Vermont, and but 8 slaves being left in New Hampshire. The census of 1810 showed 1,191,364 slaves, there being none in Massachusetts, New Hampshire, Vermont, and Ohio, the last a new state, created out of territory that was a wilderness in 1776. In 1820 the slaves numbered 1,538,038; in 1830, 2,009,043; in 1840, 2,487,455; in 1850, 3,204,313; and in 1860, 3,952,801.—The feeling in the United States was generally averse to slavery at the time that their national existence began, and in some of the southern states that feeling was stronger than it was in most of the northern ones. The ordinance of 1787, excluding the institution from the north-western territory, was supported by southern men, and some southern states abolished the slave trade with Africa while northern states continued to carry it on. Vermont abolished slavery in 1777, before she had joined the Union. Pennsylvania in 1780 provided for the gradual emancipation of her slaves, of whom 64 were still living in 1840, the relics of the 3,737 that she had in 1790. In Mas-

Massachusetts the supreme court declared that slavery was abolished by the act of adopting the state constitution of 1780, which had been so framed in one part as to provide for such a decision. Rhode Island gradually emancipated her slaves, and had but 5 left in 1840; and Connecticut did the same, having 17 in that year, and having had 2,759 in 1790. New York adopted a gradual emancipation act in 1799, at which date she had upward of 20,000 slaves; and in 1817 she passed another act declaring all slaves free on the 4th of July, 1827. New Jersey pursued the same course in 1804, her slaves in 1790 numbering 11,423, of whom 236 were living in 1850. A negro woman was sold as a slave by the sheriff of Fayette co., Penn., in 1823, to satisfy a claim for debt against her owner. That the southern states did not imitate the emancipation policy of those of the northern part of the American Union, is to be attributed to a variety of circumstances, the principal of which were the difference of climate and the difference of social life that existed between the two sections, which made slavery a far more profitable industrial institution in the South than it could ever be made in the North, where it never flourished, and where in some instances the young of slaves were given away. The invention of the cotton gin had a prodigious effect on the institution, as it made slavery very profitable, and so helped to change that opinion which had existed in the South both in the colonial and in the revolutionary times, and which, as expressed by such men as Washington, Jefferson, and Patrick Henry, looked to the extinction of slavery. Instead of that opinion now prevailing, slavery is upheld in the southern states as an institution excellent in itself, and to be in every way promoted and extended, some of its more ardent friends going so far indeed as to advocate the resumption of the slave trade with Africa. The system of American slavery does not resemble that of Greece or that of Rome, but is based on the alleged inferiority of the African race. The Greeks and the Romans enslaved white men of all races with whom they came in contact, and the modern nations of Europe have done the same thing, therein imitating the practice of Asiatic and African communities. So did the Barbary states, in which, notwithstanding their proximity to the country of the blacks, there were probably as many white as colored slaves. In America, however, the idea of holding white men in slavery is abhorrent to the minds of the most devoted supporters of slavery. That is the destiny of the colored race, in their estimation. But, owing to the illicit amalgamation of the white and black races which is a concomitant of slavery, there is no inconsiderable number of American slaves in whom the proportion of African blood is so slight as to be almost or quite imperceptible. The aversion to color is so far shared in the non-slaveholding states, that in only one of their number (Vermont) are negroes entirely

the equals of the whites before the law; and socially they are everywhere treated as an inferior caste.—Slavery has been opposed by eminent men in America from the beginning. Washington, Jefferson, Madison, Franklin, Jay, Hamilton, and many more of those who took a conspicuous part in laying the foundations of the government, regarded slavery as a great evil, inconsistent with the principles of the declaration of independence and the spirit of Christianity. They confidently expected that it would gradually pass away before the advancing power of civilization and freedom; and, shrinking from what they regarded as insurmountable obstacles to emancipation in their own time, they consented, in forming the constitution, to give the system certain advantages which they hoped would be temporary, and therefore not dangerous to the stability of the government. Societies to promote the gradual abolition of slavery were formed in many of the states. The Pennsylvania abolition society, founded in 1775, is still in existence. Its first president was Benjamin Franklin, its first secretary Benjamin Rush. In 1790 it sent a memorial to congress, bearing the official signature of "Benjamin Franklin, president," asking that body to "devise means for removing the inconsistency of slavery from the American people," and to "step to the very verge of its power for discouraging every species of traffic in the persons of our fellow men." The New York manumission society was formed in 1785, John Jay being the first president, and Alexander Hamilton his successor. Similar associations were also formed in Connecticut, Rhode Island, Delaware, Maryland, and Virginia. These societies exerted a strong influence in favor of the abolition of slavery in several northern states. In 1819-'20 the opponents of slavery made a stern resistance to the admission of Missouri to the Union as a slave state, and were defeated. This event was followed by a period of profound repose in regard to the whole subject. The publication, by Benjamin Lundy, a Quaker, of a small journal at Baltimore entitled "Genius of Universal Emancipation," was almost the only visible sign of opposition to slavery until William Lloyd Garrison established "The Liberator" in Boston, Jan. 1, 1831. Accepting the definition of American slavery furnished by the statutes of the slave states, which declare the slaves to be "chattels personal, in the hands of their owners and possessors, to all intents, constructions, and purposes whatsoever," he asserted that slaveholding was a sin against God and a crime against humanity; that immediate emancipation was the right of every slave and the duty of every master. On Jan. 1, 1832, the first society on this basis was organized in Boston by 12 men, Arnold Buffum, a Quaker, being president. The American anti-slavery society was formed in Philadelphia in Dec. 1833, Arthur Tappan being its first president. This society and its auxiliaries expressly affirmed



that congress had no right to abolish slavery in the slave states, and they asked for no action on the part of the national government that had not, up to that time, been held to be constitutional by leading men of all parties in every portion of the country. They pronounced all laws admitting the right of slavery to be "before God utterly null and void." They declared that their principles led them "to reject, and to entreat the oppressed to reject, the use of all carnal weapons for deliverance from bondage;" their measures, they said, would be "such only as the opposition of moral purity to moral corruption, the destruction of error by the potency of truth, and the abolition of slavery by the spirit of repentance." By means of lectures, newspapers, tracts, public meetings, and petitions to congress, they produced an intense excitement throughout the country, the effects of which were soon manifest in the religious sects and political parties. The American anti-slavery society and those affiliated with it were opposed to the formation of a distinct anti-slavery political party, deeming it wiser to attempt to diffuse their principles among the members of all parties. In 1840, on account of differences upon this and other matters affecting the policy of the movement, a portion of the members seceded and formed the "American and Foreign Anti-Slavery Society." The "liberty party" was organized in the same year, mainly by the seceders and those in sympathy with them. This party was mostly absorbed by the "free soil party" in the presidential election of 1848, though a small number of persons, holding the opinion that the national government had constitutional power to abolish slavery in every part of the country, continued to act together under the name of liberty party until a very recent period. The free soil party was in its turn absorbed by the republican party, which in the presidential election of 1856 first became the exponent of the doctrine of slavery restriction. In 1844 the American anti-slavery society openly avowed its conviction that the so called "compromises of the constitution" were immoral; that, consequently, it was wrong to swear to support that instrument, or to hold office or vote under it. From that time until the secession of the slave states, the abolitionists of this school avowed it to be their object to effect a dissolution of the American Union and the organization of a northern republic where no slavery should exist. "The American Abolition Society" was formed in Boston in 1855, to promote the views of those who hold that the national government has constitutional power to abolish slavery in every part of the Union. The "Church Anti-Slavery Society" was organized in 1859, for the purpose of convincing the American churches and ministers that slavery is a sin, and inducing them to take the lead in the work of abolition. There have been few slave conspiracies or insurrections in the United States, and the ser-

vile population has never produced any band of men to be compared with the Maroons of the West Indies, who so long baffled the exertions of the whites to subdue them. It is estimated that more than 30,000 American slaves, after escaping from bondage, have found an asylum in Canada. They were aided in their flight by opponents of slavery in the free states.—The laws of the slave states for the restraint and government of their servile populations are generally severe, and are based on the idea of the perpetuity of the institution of slavery. When questions arise upon the trial of an action which will determine whether the condition of slavery exists in any individual case, the laws and the courts of the slave states generally assert a presumption in favor of liberty, and apply the old maxim: *Jura in omni casu libertati dant favorem*. But this presumption is so far subject to the general and prior presumption of slavery against every negro, that the latter presumption casts the burden of proof on the claimant for freedom. When the fact of slavery is established, it is absolute. There is no such thing as partial freedom, or imperfect slavery; and therefore a bequest or other disposition of slaves which limited or qualified the rights of their owners, would be wholly void, unless the qualification could be dealt with as an independent provision, and as such avoided, leaving the bequest in force. So if partial payments of the price of freedom are made to an owner, he retains an absolute right to the whole of the services of the slave. The most general rule invoked to determine whether a person is a slave, is, that the *status* of the mother in this respect is the *status* of her children. The question of freedom may be tried before the courts in various ways; as by an action of trespass and false imprisonment, an action on the case in the nature of ravishment of ward, and a special proceeding upon petition. The courts do not suffer a person claiming freedom to be defeated by any mere irregularity of form, and will compel one who claims him as his slave to bring him into court, to treat him with humanity, and allow him a reasonable opportunity to obtain evidence. In one case the claimant of the alleged slave was compelled to give security that he should go at liberty until the next term of the court, that he might procure testimony. And although the record before the court, with the pleadings and the points made by plaintiff or defendant, exhibit no ground for adjudging the plaintiff to be free, yet if the court see any such ground, they will give the plaintiff the benefit of it. Thus in a case at New Orleans, a mulatto girl claimed her freedom on the ground that her mother was free. This fact was not made out; but it appearing that her owner had sent her to France, there to learn the art of hair-dressing, the court held that this made her free, Justice Matthews saying: "Every thing which may properly be done *in favorem libertatis* should be done,

even to notice facts *de hors* the record." The presumption of law against a negro that he is a slave, exists only in favor of one claiming the negro as his property, and it is said to apply only to the pure negro, and to be destroyed by any mingling of white blood. Rules of evidence have sometimes been qualified or suspended in favor of one claiming to be free; but the supreme court of the United States has refused to do this. It seems not to be settled what damages may be given to a successful claimant of liberty; but the prevailing rule places this matter within the power of the jury.—A slave has no power to make any valid contract whatever. He may however act as the agent of a free man, and so bind his principal. Slaves are looked upon as persons by the criminal law. They have no direct remedy for injuries sustained by them from a stranger; but their owner may recover damages from the wrong doer, not only, as it seems, to secure the owner from loss, but for the protection of the slave. For injuries received from the owner the slave has, generally speaking, no remedy whatever; but in some states there are statutory provisions in his behalf. In Virginia it has been distinctly held that an indictment cannot be sustained against a master, or even a hirer, for the excessive and cruel beating of a slave; but it has also been held in that state, that when the wilful and excessive whipping of a slave caused his death, although there was no intent to kill, it was murder in the first degree. (7 Grattan, 673.) For torts committed by a slave, his owner is answerable in damages. If he commits an offence punishable with death, and is executed, his value is paid to the owner from the state treasury. As a slave who runs away is considered as stealing himself, the common rule of law applies, and no person can acquire property in him, even by buying him from a third party, innocently and for value. As a slave can make no contract, so his contract with his master is not binding on his master; nor can he, while a slave, appear as a suitor, in a court either of law or equity, to enforce any contract against any person. He cannot take by descent nor by purchase, unless freedom accompany the gift of property; and a bequest to a free person in trust for a slave is void. As a general rule, slaves are considered personal chattels, although in some instances they are descendible as real estate. How far a contract made by a slave may be valid, when it is made with the consent of the master, is not certain. In Louisiana, it is said, the master may sue on such a contract, as for example on a note given to his slave. In South Carolina their incapacity to contract seems to be so complete, that it cannot be helped even by the master's consent to the contract. So if a slave receives a gift or makes a purchase, the general rule is, that it becomes the property of the master at once. If a slave finds property and gives it away, the master of the slave may claim the property

from the donee. In Alabama, a negro supposed to be free, but in fact a slave, bought his own daughter, and then gave her a deed of emancipation; whereupon the owner of the slave claimed the girl as his property. The question presented to the court was whether the slave was to be governed as to his rights by the Roman law of slavery, which denied to the slave the power of acquiring and transferring property, or by the English law of villenage, which permitted a villein to acquire property subject to the claim of his lord, but to transfer it by good title before the lord claimed it. The precise question was not determined, the girl being declared free on other grounds; but the decided tendency of the law seems to be to apply to the *status* of the slave the Roman rather than the English law. In Louisiana, and we believe in that state only, a contract made by a slave with his master for his own emancipation is held to be valid, and enforceable by the slave; and it seems now to be the law generally, although it was once otherwise, that a contract made on good consideration, between the master and a third person for the benefit of a slave, may be enforced by the third person, and that specific performance will be compelled by a court of equity.—By the Roman law a slave had a certain limited right of property; and whatever he possessed was called his *peculium*. This rule has some existence in our states where slavery exists, and especially in Louisiana. The word, as somewhat vaguely defined in the civil code of Louisiana, means the sum of money or portion of movable goods which the master has seen fit to allow the slave to hold. This right to his *peculium* plainly depends on the master's previous consent. After such consent, it may be doubted whether the master can by withdrawal of his consent destroy the slave's right; but the authorities are not clear upon this point. It has been held in South Carolina, that if a master permit his slave to hire himself out upon condition of paying him certain stipulated wages, all he makes and saves beyond his wages shall be at his own disposal. Whether this is law everywhere may not be certain; but it is the universal usage. In Louisiana, by law, slaves are entitled to the fruits of their labor on Sundays, and their masters must remunerate them if they employ them. In the other states, Sundays and certain other holidays are allowed them by custom, and on these days they often earn money by work. Their masters have a kind of right of preëmption, and may compel their labor, but pay them what they could earn elsewhere. This custom is universal, and in some places it may have become so fixed and ascertained as to have the force and sanction of law; but, with the exception above stated of Louisiana, it probably rests upon the mere liberality and consent of the master.—Of the marriage of slaves it is difficult to speak with positive certainty. The prevailing, if not universal, rule would seem to be, that the incapacity of a slave

to make a valid contract extends to the contract of marriage. It has indeed been distinctly held that the marriage usual in these states, which is only cohabitation with consent of the master, is not a legal marriage. Chancellor Kent, quoting from this case, appears to refer the invalidity of the marriage to the want of legal formalities; but in the same case it is put on the ground of their entire inability to contract. There are statutes which speak of their marriage, but not in such a way as to declare their marriages legal, and attended with the legal incidents of marriage. Even in Louisiana such a marriage is held to be a moral marriage, but to produce no civil effect whatever, because slaves are deprived of all civil rights. So far as the law or the usage on this subject can be ascertained, a slave cannot as a married person commit adultery or polygamy, nor be held liable on a wife's contracts or for necessities supplied to her, nor be made incompetent as a witness on the ground of the relation of marriage. Nor does it appear that any consent of the master can make this marriage legal, if it do not have the force of emancipation. And as what is called the marriage of the slave rests wholly on the master's consent, there is nothing in the law to prevent him from revoking his consent, annulling the marriage, and separating the parties.—The emancipation of a slave is defined to be the donation to the slave of his value. As when a slave is emancipated by will, his freedom is a specific legacy to him, so a bequest of property to a slave by his owner implies and operates emancipation. Any person may emancipate who if he did not might hold the slave; and therefore one who has held a slave so long that his original owner is barred from claiming him by a statute of limitations, may give the slave the benefit of the statute by emancipation. But the rightful owner, whose claim is thus barred, cannot emancipate the slave. The method of emancipation is usually regulated by statutes, and their provisions on this point differ in different states. One rule seems to be universal: the emancipation is ineffectual until the final and consummating act, whatever that may be, is done; and until then the master may revoke his consent and annul all that has been done, and no inchoate right is vested in the slave which even a court of equity will recognize. An emancipation may be made to take effect on a contingency. Thus, if a slave is bequeathed on condition that, if the legatee takes him out of the state, or sells him, he shall be free, by either of these acts the slave becomes free at once. As there can be no partial slavery, so there can be no partial or imperfect emancipation. Hence, if the emancipation be on conditions subsequent to the act, the conditions are void, because when the slave is manumitted he becomes absolutely free. Slaves cannot be emancipated to the prejudice of existing creditors; and such manumission would be as void as the disposal of any other property by an insolvent owner to the injury of his

creditors. The widow's right of dower in the slaves may also be an obstruction to a manumission by will, unless provision be made to compensate her out of other property. The validity of emancipation must always be determined by the laws of the state in which the slave is residing at the time with the consent of the owner. In nearly, perhaps quite, all the states now permitting slavery, the emancipation of slaves is restricted and encumbered by various provisions, intended to prevent the presence in the state of a free black population.—Beside the word *peculium*, another phrase is adopted in Louisiana from the Roman civil law, that of *statu-liber*. By this phrase is meant a person now a slave, but entitled to freedom at some future time. This law term is not, so far as we know, used in the statutes of other states; but this condition exists everywhere, and the law or usage regulating it seems to be much the same elsewhere, in many points at least, that it is in Louisiana. *Statu-liberi* are capable, in Louisiana, of taking property by bequest or donation, but not by inheritance; and such property belonging to a *statu-liber* must be taken care of for him by a curator or guardian. If he die before he becomes free, the gift reverts to the donor. It has been held that the master of a *statu-liber* will not be restrained by a court of equity from taking him out of the state, in the absence of a statutory prohibition. The condition of the children of a *statu-libera* has received much attention from the courts. It has been urged upon them, that although the slave mother has a vested right to become free at a certain time, yet she may never be free because she may die before that time, and is only a slave until the time comes which is to make her free, and therefore she must communicate to her children who are born before that time her own condition, and they are as completely slaves as if the mother were never to be free; and these views have prevailed with the courts, and such is the rule of law which seems now to be established. It has been held indeed that where one bequeaths or grants a slave, to become free *in futuro*, with an express provision that her children born in the interim shall be free, either at birth or when she is free, this provision is void. But statutes have made such children free in at least three states, Maryland, Virginia, and Louisiana; and in the last mentioned state all children of a *statu-libera*, born after she becomes entitled to her future freedom, are free at the time which would make her free, whether she be then living or dead. If there be a grant of manumission to a slave reserving a right to service for a certain time, if the whole instrument does not amount to a manumission, it has no force; if it is a manumission, then the reservation is void, because the emancipation must be complete and entire or nothing.—One incident which attends the condition of slavery, is the disqualification of a slave as a witness, in any case in which his testimony may affect

the rights of a free white man. This has been defended as the rule of the common law, on the ground that only the freeman, or a *liber et legalis homo*, was deemed "othersworth;" and also upon the supposed inability of the negro to comprehend, or his willingness to be bound by, the obligations of an oath. And in some of the states in which slavery has no existence, this disqualification seems still to attach to the negro. The Roman civil law is said by Huber to have asserted that *testis homo liber esse debet*; and so it seems to have been also in Greece. By the French civil code, a *domestique*, which word means much the same as the phrase "menial servant," is under a *quasi* disqualification, although a judicial court has the power at its own discretion of receiving his testimony. This rule rests, in some of the states permitting slavery, on positive enactments, and in others on usage and decisions; and in them, and in Ohio, Indiana, Illinois, and Iowa, the disqualification exists by statute in the case of emancipated slaves or free persons of color. Beside the general exception in the case of suits where slaves or free persons of color are the only parties, some others exist, which, however, do not so much admit the testimony of slaves, as permit the use of declarations made by them, on the ground that they are facts. Thus, if a white person refers to a negro for information, that information may be given. So a white person may allege, in his defence, that he acted on information received from a negro, and then the particulars thereof may be stated. If, however, an action exist against a white man, founded on the alleged ill treatment of a slave by his owner, or by any other white man, neither the testimony of the negro injured nor of any other negro can be received.—From the colonial times there has been a very general disposition to prohibit the education of slaves. Thus, in 1740, an act of the colony of South Carolina provided that "whereas the having slaves taught to write, or suffering them to be employed in writing, may be attended with great inconveniences," instruction or employment of this kind is punished by a fine of £100; and in 1770 a similar act was passed in Georgia. The same rule is now very generally in force, by statute or decision, in the states permitting slavery. But it is not so universal, nor so much regarded in fact, as the disqualification of a slave as a witness.—We have drawn this abstract of the law of slavery from decided cases far more than from statutes, for these are very few and generally of narrow scope. But the law of slavery, as ascertained from jurisprudence, which for the most part has done little more than recognize and enforce usages, is very much the same in all the states in which slavery is recognized by law; with the partial exception of Louisiana, where the Roman civil law colors if it does not govern, not this subject only, but the general municipal law of the state.—The colonization of

emancipated American slaves in Africa has been earnestly advocated. The colony of Liberia was founded in 1820, under American patronage, and it has been recognized by France and England. (See COLONIZATION SOCIETY, and LIBERIA.) The colony of Sierra Leone was founded by England in 1787, being composed of American slaves who had joined her flag under promises of freedom. Slavery continues to flourish in the island of Cuba, and in the other remnants of the Spanish colonial possessions, and the slave trade is all but openly carried on between Africa and that island.—Slavery began in Russia 1,000 years ago, at the time usually assigned for the origin of the empire. Domestic chattels were created from prisoners taken in war, or were purchased abroad. "Probably it was the nobles, the rich, the higher officials," says Gurowski, "who first established chattels (*rabs*) on their lands as tillers. From these originated, beside the *rab*, the *kriepostnoi kholop*, 'a serf strengthened or chained to his master,' *kriepok* signifying 'strong,' 'strengthened,' 'attached by force'—*kriepost*, 'stronghold,' &c. According to the laws collected or enacted by Vladimir and Yaroslav in the 10th and 11th centuries, *rab* and *kriepostnoi kholop* were the descendants of prisoners of war, or of those who were bought as slaves and imported as such into Russia, and also the descendants of those who unconditionally married a slave woman; while the public, grand-ducal slaves or *rabs* were condemned criminals." Serfage was not established in Russia until toward the close of the 17th century. In 1718 the census officials of Peter the Great returned all the serfs living on private estates as chattels, thus making them slaves by a few strokes of the pen. The peasants in the imperial domains were properly returned as serfs, and their condition was far better than that of the peasants on private estates, as the latter could be and were sold apart from the land to which they belonged, and the fortunes of which they had a legal right to share. When the Russian sovereigns gave estates to persons whom they were desirous to reward or to bribe, they made use of the crown domains, and the serfs transferred with the estates became chattels; and as the amount of land thus made over to private owners was very large during the 80 years that followed the census of 1718—Catherine II., in an especial manner, was most lavish in granting lands—the increase of the number of chattel slaves was correspondingly great. Alexander I. sought to exempt the serfs in such transfers, and Nicholas did exempt them in making grants of estates; and he also provided that no rural communes from the domains should be granted to private persons. When the chattel serf entered the army he became free as against his master; but the long term of his military service, and the various and dangerous character of that service, left him but little prospect of ever deriving any personal benefit from the act of his

emancipation. (See *SEKRS.*) Should the project of emancipation of the reigning czar succeed, slavery and serfdom will soon be at an end throughout the Russian empire. The following are some of the most important modern works on the subject of slavery: Thomas Clarkson, "History of the Abolition of the Slave Trade" (London, 1808); George Stroud, "Laws relative to Slavery" (Philadelphia, 1827); William Blair, "An Inquiry into the State of Slavery among the Romans" (Edinburgh, 1832); L. M. Child, "Appeal in Behalf of that Class of Americans called Africans" (Boston, 1833); Theodore Weld, "American Slavery as It Is" (New York, 1835); William Jay, "A View of the Action of the Federal Government on Slavery" (New York, 1838); David Trumbull, "Cuba, with Notices of Porto Rico and the Slave Trade" (London, 1840); Richard Hildreth, "Despotism in America" (Boston, 1840); W. Adam, "The Law and Custom of Slavery in British India" (Boston, 1840); William Goodell, "Slavery and Anti-Slavery" (New York, 1843); Wallon, *Histoire de l'esclavage dans l'antiquité* (Paris, 1847); Fuller and Wayland, "Domestic Slavery" (New York, 1847); Copley, "A History of Slavery" (London, 1852); Horace Mann, "Slavery, Letters and Speeches" (Boston, 1852); John Fletcher, "Studies on Slavery" (Natchez, 1852); "The Pro-Slavery Argument" (Charleston, 1853); F. L. Olmsted, "The Seaboard Slave States," "A Journey through Texas," "A Journey in the Back Country," and "The Cotton Kingdom" (New York, 1854-'61); the Rev. Albert Barnes, "An Inquiry into the Scripture Views of Slavery" (Philadelphia, 1855); the Rev. Nehemiah Adams, "A South Side View of Slavery" (Boston, 1855); George Fitzhugh, "Sociology for the South" (Richmond, 1855); Prichard, "The Natural History of Man" (London, 1855); Arthur Helps, "The Spanish Conquest in America, and its Relation to the History of Slavery," &c. (London and New York, 1856-'60); Weston, "Progress of Slavery in the United States" (Washington, 1857); T. R. R. Cobb, "An Inquiry into the Law of Negro Slavery" (Philadelphia and Savannah, 1858); Gurowski, "Slavery in History" (New York, 1860).

SLAVI (in the Slavic languages, *Slovane, Slavic*, which is now commonly derived from *sloro* or *slowo*, word; hence, "peoples of one tongue"), one of the most numerous and powerful groups of nations of the Indo-Germanic race, occupying at present nearly the whole of eastern Europe and parts of northern Asia. They seem to have anciently been included in the names of the Scythians and Sarmatians. Early Roman writers refer to the Slavi under the names of the Venedi (Vindes) and the Servians, both of which still designate branches of the race. In the most ancient times to which the history of the Slavi as such can be traced, their seats were around and near the Carpathian mountains, whence they spread N. toward the Baltic, W. toward the Elbe and

Saale, and finally, after the destruction of the empire of the Huns, S. across the Danube over the territories of modern Turkey and Greece. With this extension the unity of the race ceased, and they split into a number of tribes, separated from each other by political organization and different dialects. In the classification of the Slavic nations, a boundless confusion reigned among the earlier historians and philologists; but the eminent Slavic scholars Dobrovsky, Kopitar, and Schafarik have brought light into the chaos. According to their view the Slavi are divided into the eastern and western or south-eastern and north-western stems. The former of these contains three branches: 1, the Russians, who are subdivided into Russians and Rusniaks or Ruthenians (chiefly in S. E. Galicia and N. E. Hungary); 2, the Illyrico-Servian branch, comprising the Servians proper, the Rascians, Raitzi, or Hungarian Serbs, the Bosnians, Montenegrins, Slavonians, Dalmatians, Croatsians, and Sloventzi, Vindes, or Styrian Wends; 3, the Bulgarian branch. The north-western stem comprises: 1, the Lechian or Polish branch, to which belong the Poles, the Slavic Silesians, and an isolated tribe in the Prussian province of Pomerania called Kasubes; 2, the Cecho-Slovakian branch, which embraces the Bohemians, Moravians, and Slovaks in N. W. Hungary; and 3, the Sorabo-Wendic branch, containing the remnants of the Slavi of N. Germany. A large number of Slavic empires have perished in succession, as those of Bohemia, Moravia, and Poland; and at the beginning of the 19th century only one, Russia, was left, beside which, however, Servia and Montenegro maintain a semi-independent position.—In modern times a Pan-slavic movement, aiming at a closer union of all Slavic tribes, has arisen and gained considerable political importance. One of the first publicly to advocate it was the Cecho-Slovakian poet Kollar, who in a Slavic periodical of Hungary, entitled *Hronka*, published an address to all the Slavi, urging them to drop their numerous family feuds, to consider themselves as one great nation, and their related languages essentially as one. The idea was seized upon with eagerness by the Bohemians and other Slavi of Austria, who by such a Pan-slavic organization hoped to prevent their being absorbed by the German and Hungarian races. It has since gained great strength in Austria by the endeavors of Schafarik, Palacky, Gaj, and other eminent Slavists, and has also found many distinguished advocates in Poland and Russia, in literary as well as in political circles. From a federative union of all Slavi under a democratic form of government to a union under the sceptre of the czar, every possible form of future organization has found more or less able and more or less open advocates, the movement being principally fostered by Russian, and according to circumstances also by Austrian, influence. In the Slavic congress of Prague, assembled in the spring of 1848, the revolutionary

element prevailed, leading to a bloody conflict with the Austrian troops under Windischgrätz, and the severe persecution of various members of the congress. The opening of the Austrian provincial diets and central *Reichsrath* in 1861 was productive of new Pan-Slavic manifestations. The aggregate number of the Slavi was estimated by Schafarik 20 years ago at about 80,000,000, of whom about 89,000,000 were Russians, 18,000,000 Rusniaks or Ruthenians, 10,000,000 Poles (including Silesians and Kassubes), 4,500,000 Bohemians and Moravians, 3,500,000 Bulgarians, 2,800,000 Slovaks, 1,000,000 Slovenzi or Vindes, &c.—The old or church Slavic (so called because it is still used in divine service) is the oldest branch of the Slavic languages. The Bible or parts of it were translated into it by Cyril and Methodius in the 9th century, the former of whom also invented an alphabet for it, which was called after him the Cyrillic, and is still used by the Servians belonging to the Greek church. The church books written in the old Slavic are still used by the Servians and Russians. Among the most important documents of this language are the Gospels of Ostromir and Rheims. The oldest works of the Servian and Russian literature, as the works of Nestor, were also written in this language. There is a grammar of it by Miclosich (Vienna, 2d ed., 1854). Formerly this was regarded as the common language of the ancient Slavi and as the mother of all the present Slavic idioms, but modern investigations have clearly shown that it was only their elder sister. Where this old or church Slavic was spoken, is a controversy not yet settled; but the best Slavic authorities favor the claims of Bulgaria, regarding the modern or new Bulgarian as its direct descendant. It is no longer a living tongue, but its treasures are still an inexhaustible mine for its younger sisters. Of the living Slavic languages the following have a considerable literature: the Russian, the Polish, the Bohemian, and the Servian. These languages, as well as their literatures, are treated separately under their respective heads. Among the peculiarities of the Slavic languages are the following: They have 3 genders. Like the Latin, they have no articles, with the exception of the Bulgarian, which suffices one to the noun. The nouns, pronouns, and adjectives have 7 cases. Some dialects have a dual, in which the nominative and accusative, the genitive and locative, the dative and instrumental cases are always alike. The verbs are divided into perfect and imperfect, whose relation to each other is about the same as that of the perfect and imperfect tenses in the conjugation of the Latin verb. All the dialects are comparatively poor in vowels, and like the oriental languages utterly deficient in diphthongs. There is a great variety of consonants, and especially of sibilants, but no *j* is to be found in any genuine Slavic word. Slavic words very seldom begin with *a*, and hardly ever with *e*. The letters *l* and *r* have in some Slavic languages the value

of vowels, and words like *turdy*, *vjtr*, are in metre used as words of two syllables.—The primitive religion of the ancient Slavi seems to have been a kind of monotheism, which gradually passed into polytheism, and lastly into pantheism. Yet the idea of one divine essence was never completely lost, at least among the priests. All Slavi worshipped as their highest god Sviatovist, beside whom the other divinities were accounted as mere demigods. Among these Perun and Radegast received the highest honors. In addition to their gods, they believed in good and evil spirits, and demons of different kinds, in the immortality of the soul, and in a retribution after death. Worship was held by their priests in forests and temples, and sacrifices were offered, consisting of cattle and fruit. The dead were burned, and their ashes preserved in urns.—See Schafarik, *Slawische Alterthümer* (2 vols., Leipsic, 1843), and Talvi, "Historical View of the Languages and Literature of the Slavic Nations" (New York, 1850).

SLAVONIA, or SCLAVONIA (Hun. *Tótország*), a province of Austria, formerly incorporated with Hungary, but since 1849 forming with Croatia an independent crown land. (See CROATIA.) Slavonia is bounded N. by Hungary, E. and S. by the Slavonian and W. by the Croatian military frontier (see MILITARY FRONTIER); area, about 8,000 sq. m.; pop. of the province alone, 260,000. It is divided into the 8 counties of Pošega, Verőcze, and Szerém or Symria. Its capital is Eszék. A small majority of the inhabitants belong to the Roman Catholic church, the rest to the Greek church. The chief rivers are the Danube and the Drave, which separate it from Hungary. It is traversed throughout its whole length by a branch of the Carnian Alps, the ridge of which is covered with forests. The remainder of the country consists partly of wide and fertile plains, partly of lower hills, covered with vineyards and orchards. Nearly all kinds of grain and fruit are found in abundance; and the mountains yield a copious supply of marble, iron, copper, and argentiferous lead. The manufactures are of little account, with the exception of that of glass in the county of Eszék; yet the transit trade along the navigable rivers is considerable. The inhabitants belong to the Illyrico-Servian branch of the Slavi, and speak a dialect of the Servian language. Those who belong to the Greek church use the language and the alphabet of Servia proper, while the Catholic Slavonians have a different mode of writing, and use, in common with other Catholic branches of the Illyrico-Servians, the Latin alphabet, although their language on the whole differs but little from the Servian. Neither branch has a literature of its own. A grammar of the dialect of the Catholic Slavonians has been published by Reloovich (Buda, 1789), and a dictionary by the same (Vienna, 1796). They have also a translation of the Bible by Katanisich.—Under the Romans Slavonia formed part of the province of Pannonia, and was called Pannonia Savia.

Later it belonged to the Byzantine empire, until it was occupied by the Avars. In the time of Louis le Débonnaire it had its own prince, who submitted to the sovereignty of the Franks. In the 11th century it was incorporated with Hungary. In 1524 it was taken by the Turks, and was formally ceded to them in 1562; but in 1699, by the peace of Carlowitz, it was retroceded to Austria, resuming also its relation to Hungary. In 1849 it was united with Croatia.

**SLEEP**, a period of repose in the animal system, of suspension of nervous and muscular activity, rendered necessary for the reparation of the vital powers, from the fact that the exercise of their functions is destructive of the substance of the organs. In sleep there is more or less complete unconsciousness of external impressions upon the organs of sense, which may be dissipated by any extraordinary excitement, in this respect differing from the torpor of coma produced by abnormal conditions within the cranium or the action of narcotic poisons. In the deep sleep after extreme fatigue there may be a complete suspension of the activity of the cerebrum and the sensory ganglia; some authors consider dreams a proof of imperfect sleep, while others maintain that there are always dreams during sleep, though they may not be remembered. The refreshing power of sleep depends on the nutritive renovation effected during its continuance; it is a necessity of the system, and must be periodically indulged in. After 12 to 16 hours of waking a sense of fatigue is experienced under ordinary circumstances, showing that the brain needs rest, and this cannot be shaken off unless by some strong physical or moral stimulus; more sleep is required by the young, and less by the aged, in proportion to the rapidity of the waste of the tissues. When the sense of fatigue has reached its maximum, sleep will supervene, even under the most unfavorable circumstances; the soldier falls asleep with the din of battle around him, the sick under violent pain, the sentinel on his post, the doctor and the coachman on their midnight drives, the student over his books, and the tired workman in every branch of labor. It may be retarded by uncommon mental concentration, excitement, suspense, or the exercise of a strong will, always however with an exhaustion of nervous power which requires a proportionally long period of repose. Stillness, darkness, and quiet, and monotonous low noises, like the buzzing of insects, the murmur of the wind in the trees, the purling sound of running water, the rippling on a beach, the suppressed hum of a distant town, the droning voice of a dull reader, or the mother's lullaby, promote sleep; gentle movements, like the swinging of a hammock, the rocking of a cradle or boat, the hushing trot of the nurse, or even the soft rubbing of the body, are also conducive to sleep; in reading a dull book the eyes wander fatigued from page to page, and the excitement of the mind is not enough to overcome the tendency to

sleep. Persons get accustomed to sleep amid loud noises, as in the vicinity of mills, forges, and factories, and often cannot readily fall asleep away from such sounds. The transition from sleep to the waking state, and *vice versa*, is generally gradual, but sometimes sudden. The foetus may be said to be in a continued sleep, and the excess of the sleeping over the waking hours prevails during infancy and childhood, or while growth is greater than the decay of the tissues, and this sleep is more profound as well as longer. Persons of plethoric habit, with good appetite and powers of digestion, are usually sound sleepers; the nervous sleep comparatively little, but profoundly; lymphatic, passionless individuals, who vegetate rather than live, are generally long sleepers. The amount of sleep required depends much on habit, and the smallest sleepers have generally been men of the greatest mental activity; but while Frederic the Great and John Hunter required only 5 hours' sleep, most men need 6 to 8 to keep in health; as a general rule, the amount necessary to refresh the system is in proportion to the amount of mental exertion of the individual.—The ordinary phenomena of this state are known to all; while the brain sleeps, and the senses rest, and the muscles repose, the functions of respiration, circulation, nutrition, secretion, and absorption continue; the true spinal marrow and ganglionic nervous system never sleep while life continues; in some cases of suspended animation there is not only torpor of the sensorial centres, but a greater or less diminution of the activity of the organic functions, very much as in the state of hibernation. While man and most animals naturally sleep at night, many others rest by day and are active at night, as the moths, goatsuckers, owls, bats, and the larger carnivora. During sleep the temperature of the body falls about  $1\frac{1}{2}$ ° F.; hence the chilliness generally felt during a nap in the daytime, and the propriety of throwing some covering over the body during sleep, even in summer, to avoid taking cold; in this state there is also less power of resisting diseases, especially those of a malarious character. Nothing is so refreshing during sickness, or so conducive to rapid convalescence, as quiet sleep; sleeplessness, in some forms of mania, cerebral inflammation, and nervous diseases, may continue for weeks or months. A habitual deficiency of sleep, from excitement or excessive study, produces sooner or later headaches, cerebral disturbance, restlessness and feverishness, and, if the warning be not seasonably heeded, inflammation of the brain, apoplexy, paralysis, insanity, and imbecility. The cases of sleep prolonged for many days or even weeks are examples of hysteric coma rather than excessive somnolence; an unusual tendency to ordinary sleep generally indicates congestion of the brain with an apoplectic diathesis; the sleepiness from exposure to severe cold depends on the increased pressure of blood on the brain



from the contracted state of the superficial vessels, the fatal termination being accelerated by the less amount of heat generated in the body during sleep. (For further details see *ANIMAL MAGNETISM, COMA, DREAM, and SOMNAMBULISM*.)—The more or less complete suspension of the organic functions of plants during the cold season has been called their winter sleep. They have also a diurnal sleep, in which the leaves and flowers undergo periodical changes in their position, folding, and closing, which to a certain extent may be compared to the sleep of the animal functions. These phenomena are not due entirely to any external conditions of light, heat, and moisture, as the experiments of De Candolle and Meyen show, but depend on causes inherent in the plants.

SLEIDAN, or SLEIDANUS, JOHANN, a German statesman and author, whose real name was Philipson, born in Sleida, near Cologne, in 1506, died in Strasbourg, Oct. 31, 1556. He studied at the universities of Cologne, Liège, Louvain, Paris, and Orleans, and became profoundly versed in law and classical literature. In 1535 he entered the public service of France, and was creditably employed on several occasions in diplomatic business; but having secretly adopted the doctrines of Luther, he repaired in 1542 to Strasbourg, where he was appointed by the Protestant princes historian of the Smalcaldic league, and by the town council professor of law. The remainder of his life was passed in the discharge of various important public duties, including negotiations with France and England, and his attendance in 1551 at the council of Trent as deputy from Strasbourg. His reputation at the present day rests chiefly on his great work entitled *De Statu Religionis et Reipublicæ, Carolo Quinto Casare, Commentarii* (1553), in 25 books, to which a 26th was added from a manuscript found among his papers. It embraces a history of the reformation from 1517 to 1556, and is esteemed not less on account of its faithfulness and its impartiality, which elicited the commendation of Pope Paul IV., than of the simple and elegant Latin in which it is written. It has been translated into most modern languages, the best English version being that of E. Bohun (1689), with a continuation to the close of the council of Trent in 1563. The most esteemed Latin edition is that of J. G. Böhm (Frankfort, 1785-'6). Sleidan's remaining works are: *De quatuor Summis Imperiis, Babylonico, Persico, Græco, et Romano, Libri III.*, which has been translated and continued by various hands; *Summa Doctrinæ Platonis de Republica et de Legibus* (1548); and his *Opuscula*, first published in 1608.

SLIDELL, JOHN, an American politician, born in the city of New York in 1793. He entered commercial life, but was not successful, and removed to New Orleans, where he embraced the profession of the law, became one of the most prominent members of the Louisiana bar, and was appointed by President

Jackson U. S. district attorney. He was frequently elected to the state legislature, and was a representative in congress from 1843 to 1845. In 1845 he was sent by President Polk as envoy extraordinary and minister plenipotentiary to Mexico, to negotiate for the settlement of the threatening questions then in dispute between the two countries. He arrived at Vera Cruz in November, but his mission proving fruitless, he set out on his return in the spring of 1846. In 1853 he was chosen U. S. senator for the unexpired term of Senator Soulé, who had been appointed minister to Spain, and was afterward reelected for 6 years. He spoke rarely in the senate, but served on important committees, and exerted great influence. He was a strenuous supporter of the doctrines of the southern rights party, and after Louisiana had passed the ordinance of secession, in Jan. 1861, he withdrew on Feb. 4 from the senate with his colleague. On retiring he made a menacing and defiant speech to the remaining senators, in which he asserted that in case there was any attempt to coerce the seceding states, the great powers of Europe would break the "paper blockade," that every sea would swarm with the volunteer militia of the ocean to such an extent that the mercantile marine of the North must either sail under foreign flags or rot at its wharfs, and that men and ships for privateering would be derived from New York and New England. He was not prominent, however, either in the military or civil proceedings of the seceding states until the autumn of 1861, when he was despatched to act as commissioner to France, together with Mr. Mason of Virginia, who was appointed in the same capacity to England. Sailing from Charleston, S. C., they ran the blockade, and embarked at Havana on board the English mail steamer Trent. On Nov. 8 Capt. Wilkes, of the U. S. steam frigate San Jacinto, boarded this vessel, and arrested both the commissioners and their secretaries, who were placed in confinement in Fort Warren, Boston harbor. Their capture having however been informal, they were released on the reclamation of the British government, and sailed for England Jan. 1, 1862.

SLIGO, a county in the province of Connaught, on the N. W. coast of Ireland, bounded by Leitrim, Roscommon, Mayo, and the Atlantic ocean; area, 721 sq. m.; pop. in 1861, 125,079. The chief towns are Sligo, the capital, Dromore, and Toberecurry. The coast line is generally rugged, and is deeply indented by the bays of Sligo and Killala. Sligo bay is about 6 m. wide at the mouth, and extends inland 10 m. to the town of Sligo. There are several dangerous sands in both Sligo and Killala bays, and along the coast to the E. of the latter. The principal rivers are the Sligo, Moy, Arrow, Awinmore, and Easky. Lough Gill, the chief lake, is about 6 m. long and 2 broad, and is remarkable for the beauty of its scenery. A great deal of the surface of Sligo is mountainous and boggy; but none of the summits

are much more than 1,300 feet in height. Iron ore appears in several places, and copper and lead mines were formerly worked. Coarse woollens and some other articles for domestic use are manufactured. There are many remains of antiquity in Sligo. The county returns 3 members to parliament, 2 for the county and 1 for the borough of Sligo.—SLIGO, the capital, is situated at the head of an arm of the bay of the same name; pop. in 1861, 18,361. Vessels drawing more than 13 feet are obliged to anchor a mile below the town. In Jan. 1859, 84 sailing vessels and 3 steamers, of an aggregate of 4,793 tons, were registered at the port.

SLOANE, SIR HANS, a British physician and naturalist, born in Kilyleagh, county Down, Ireland, April 16, 1660, died in Chelsea, near London, Jan. 11, 1753. At an early age he evinced a strong inclination for the study of natural history, and having chosen medicine as his profession, he repaired to London and put himself under the instructions of the most eminent teachers of chemistry and anatomy. His knowledge of botany and other branches of natural history at the same time attracted the notice of Ray and Boyle, with whom he contracted an intimacy which lasted as long as they lived. After a tour on the continent, he settled in 1684 in London, and was soon after elected a fellow of the royal society. In 1687 he accompanied the duke of Albemarle to Jamaica in the capacity of physician, and during a residence of 15 months on the island made large collections of natural curiosities, particularly of plants, beside acquiring the materials for an elaborate work published many years afterward. Returning to London, he was chosen physician of Christ's hospital in 1694, a position which he filled for 36 years. Having shortly before this time been elected secretary of the royal society, he succeeded in reviving the "Philosophical Transactions," which had been for some years discontinued, and until 1712 he acted as editor of the work. Meanwhile he had formed the nucleus of a comprehensive cabinet of curiosities, which it became one of the chief objects of his life to enrich and enlarge, and which in 1701 received a very considerable augmentation by the bequest of the valuable collection of William Courten, the greater part of whose fortune had been expended in the acquisition of rarities. In 1707 appeared the first volume (fol.) of his "Natural History of Jamaica," of which the second was published in 1725, and in 1708 he was elected a foreign member of the royal academy of sciences at Paris. In 1716 he was created a baronet, being the first English physician on record on whom that honor had been conferred, and was also appointed physician-general to the army, which office he held until 1727, when he became physician in ordinary to George I. In 1719 he was elected president of the college of physicians, and in 1727 succeeded Sir Isaac Newton as president of the royal society, of which he had been for a number of years pre-

vious the vice-president. At the age of 80 he formed the resolution of retiring from public life, and in Jan. 1741 removed his library and collections to an estate in Chelsea, purchased in 1720, where he passed a tranquil old age. He died after an illness of 3 days, and was followed to the grave by a greater concourse of people than, it was said, had ever before assembled on a like occasion. His collections, amounting to 200 volumes of dried plants and over 80,000 other specimens of natural history, beside a library of 50,000 volumes and 3,566 manuscripts, were, by the direction of his will, offered to the nation for £20,000, a sum which did not equal a fourth part of their value. The legacy was accepted by parliament, and in its purchase originated the British museum. Among the more important benevolent schemes in which Sir Hans was engaged during his life, was the establishment of a dispensary for providing the poor with medical services and medicines gratuitously, and of the foundling hospital. He also presented the apothecaries' company with the freehold of their botanic garden, which formed part of his estate at Chelsea, on condition that they should preserve the land for ever as a physic garden. His private benefactions were numerous and well applied, and during the long period that he held the office of physician to Christ's hospital he devoted his salary to charitable purposes. His writings, in addition to those specified, comprise a Latin catalogue of the plants of Jamaica, a treatise on sore eyes (once highly esteemed), and a number of contributions to the "Philosophical Transactions." In a scientific point of view he was noted rather as a diligent and discriminating collector than as a man of original ideas. He was the first in England to introduce into general practice the use of bark, and he gave a considerable impulse to the practice of inoculation by performing that operation on several of the royal family.

SLOE (*prunus spinosa*, Linn.), a large spiny shrub, or occasionally a small tree 30 feet high, with creeping roots throwing up numerous suckers, the bark black and the leaves obovate, elliptical, or ovate, downy beneath, sharply toothed, dark green; the flowers appearing before the foliage, white, solitary; the fruit globose, black, covered with a copious bloom when ripe, the flesh austere. There are several varieties, of which one has double flowers. The sloe occurs throughout Europe, growing equally well in fertile and sterile soils; it is likewise seen in waste places and by the roadsides from eastern New England to Pennsylvania, being adventitious from Europe. The wood of the trunk is hard and takes a fine polish; the juice of the fruit is said to enter largely into the manufacture of cheap port wines; the bark has been used as a febrifuge, and in tanning leather; with an alkali it affords a yellow dye, and with sulphate of iron a beautiful black ink. It is readily propagated from suckers or from the seeds. (See PLUM.)

**SLOOP**, a sailing vessel with one mast, rigged fore and aft, that is, having a triangular foresail attached to the bowsprit and mast, and a mainsail aft the mast, attached to a gaff above and a boom below, and to the mast by its foremost edge. It differs from the cutter in having a fixed steveing bowsprit and a jibstay. Sloops may be of any size from a mere boat to a vessel of 150 or 200 tons. They are mostly employed in the coasting trade. Steam propellers are often sloop-rigged.—A sloop of war is a war vessel rigged either as a sloop, schooner, ship, or brig, and mounting 18 to 32 guns.

**SLOTH**, the name of the edentate mammals of the family *tardigrada* (Ill.) and genus *bradypus* (Linn.); both the family and generic names are derived from the extreme slowness of the gait; it is *le paresseux* of the French. The sloths were placed by Linnæus in his order *bruta*, by Erxleben between the lemurs and opossum and the true edentates, and by Boddaert with the bats; De Blainville regarded them as anomalous quadrumana organized for climbing, and Cuvier as the link between edentates and pachyderms. The skull is small, rounded, flat, and truncated in front; the jaws very short and the face very little projecting beyond the line of the cranium; the malar bone gives off a zygomatic process which runs backward and passes above the corresponding one of the temporal bone without touching it, a 2d process descending outside the lower jaw, which is very strong. The fore legs are much longer than the hind, and all the toes end in long curved claws, channelled underneath, the bones firmly united together and the claws naturally turned in against the soles; the fore feet have either 3 or 2 toes, and the hind feet 3 toes; the latter are articulated obliquely on the leg, so that only the exterior edge touches the ground, of course making progression on a level surface very awkward; the pelvis is so wide and the thighs so laterally directed that the knees cannot be brought together. The ears are very short, and concealed under the hair, which is dry, harsh, and coarse; that the circulation may not be arrested by pressure on a single trunk, and especially that the velocity of the blood may be retarded and permit slow and long continued contraction of the muscles of the arms and legs, the axillary and iliac arteries, instead of pursuing their usual course down the limbs as single vessels, suddenly subdivide into from 40 to 60 small trunks of equal size, freely anastomosing with each other, looking somewhat like a mass of varicose veins, and distributed chiefly to the muscles. The stomach is divided into 4 cavities without folds, the intestine is short, and the cæcum absent; the mammae are 2, and pectoral; there is a common cloaca, as in birds, for the expulsion of the urine and fæces. The dental formula is  $\frac{2}{1}$ , the teeth being simple, separated, nearly cylindrical, without roots, with an undivided hollow base continually growing as they are worn by use, and composed of dentine and ce-

ment without enamel; there are no incisors; the anterior molars are very small in the 3-toed sloth, but in the 2-toed are long, pointed, resembling canines, and the lower placed behind the upper. The tail is very short, or absent. The sloths were considered by the early naturalists as imperfect and deformed creatures, and indeed they are very slow in their movements and awkward on the ground; but in the trees, their natural home, their peculiarities of structure are as admirably adapted for their convenience and enjoyment as in any other animal; the fore limbs have great freedom of motion, and all are so constructed that by means of the claws they suspend themselves to the branches of trees and hang for a long time, and even sleep, back downward. They are rarely seen on the ground, and for the reason that they can pass from one tree to another by the interlocking branches for miles in the thick forests of South America, which they inhabit from Guiana to Paraguay, some species extending to Peru, and according to some authors into Central America. They are rarely more than 2 feet long, and their hair resembles in color the bark of the trees upon which they live; the food is entirely vegetable, the leaves and twigs of trees. They have one young one at a time, which clings to the mother's back, hiding among the hair; the native name is *ai*, from their feeble plaintive cry; they are remarkably tenacious of life, and so apparently unconscious of pain that the sum of their happiness, which approaches reptilian insensibility, is perhaps as great as that of any other animal, though they have neither strength to resist, speed to escape, nor cunning to deceive, and are, as Buffon says, prisoners in the immensity of space, and confined almost to the tree on which they are born.—Linnæus gave the name of *B. tridactylus* to a 3-toed sloth, under the impression that there was only one species thus characterized, whereas Wagner describes several in the *Archiv für Naturgeschichte* for 1850. The animal referred to by Linnæus is of a grayish color, with the body 14 inches long, the head about 3, the tail 1, the fore limb 11, the hind 8, and the claws 2 to 2½; it has 9 cervical vertebrae, and 14 ribs on each side, of which 9 are true; the thumb and little finger are rudimentary and hidden under the skin; there is a rudimentary clavicle attached to the acromion; the hair is reversed on the forearm. It has been calculated that it takes only 50 steps a day, consuming a month in traversing a mile; if by chance it ascends a tree too remote from another to admit of a passage across, the natives say that it rolls itself in a ball and drops to the ground, and the thick wiry hair would render such a fall comparatively harmless; from its habits it can rarely if ever drink; its flesh and skin are useless; in captivity it is exceedingly stupid and uninteresting. In the *B. cuculliger* (Wagl.) there is a longitudinal black band on the neck, with 2 reddish spots on each side; above it is mixed brown, reddish and

whitish, hence called by Buffon *ai à dos brûlé*; it is grayish and brown below, and the face is surrounded by whitish hairs. The collared sloth (*B. torquatus*, Ill.) is 17 inches long, with black and naked face, general dirty yellow color, with a collar of long black hairs, and red forehead, chin, cheeks, throat, and chest; palms and soles naked. The unau or 2-toed sloth (*B. didactylus*, Linn.; genus *cholépus*, Illig.) is mixed brown and white, paler below; it is about 2 feet long, with, according to Daubenton, 23 ribs on each side, of which 12 are true; the clavicles are complete, and the tail is wanting; it has a longer muzzle and shorter fore legs than the 3-toed species, and is a more active animal, especially at night; it inhabits the same region, and is sometimes eaten by Indians and negroes.—For the fossil edentates see MEGALONYX, MEGATHERIUM, and MYLODON; for details on the anatomy of the genus see COMPARATIVE ANATOMY and EDENTATA.

SLOVAKS, the name of a Slavic tribe, forming together with the Bohemians and Moravians the Cecho-Slovakian stem of the western branch of the Slavi. (See SLAVI.) They inhabit the N. W. and part of the adjoining mountain regions of Hungary, and are scattered through the whole of the country. In the 9th century they formed the nucleus of the Moravian empire, but after the battle at Presburg in 907 they were gradually subjugated by the Magyars. Their number is estimated at about 2,000,000, and by some even as high as 2,750,000, of whom about  $\frac{4}{5}$  belong to the Protestant and the others to the Roman Catholic church. The language of the Slovaks is more broken up into different dialects than perhaps any other living tongue, and is nearest related to the Bohemian, between which and the Croato-Vindish dialects it forms the link of connection. The Slovakian has never been a literary language; an unsuccessful attempt to render it so was made about 40 years ago. Most of their scholars prefer the use of the Bohemian or the German language, as did the most celebrated Slovaks, Kollar and Schafarik, and the poets Holly, who translated the Latin and Greek elegiac poets, and Roznay, who translated Anacreon. They have however in their vernacular dialect a translation of the Bible by Palkowicz (printed in 1831), several volumes of sermons, a dictionary in 4 volumes by Bernolak, and some other books. A collection of the best popular songs has been published by Kollar (2 vols., Buda, 1834).

SLOVENTZI, the name of a Slavic tribe forming a subdivision of the Illyrico-Servian branch of the eastern stem of the Slavi. (See SLAVI.) They inhabit the duchies of Styria, Carinthia, and Carniola, and also the banks of the rivers Raab and Muhr in S. W. Hungary. They call themselves Sloventzi, but are known by foreign writers under the name of Vindes or Corutans. They migrated into the countries which they now inhabit in the 6th century, and in 788 were subjugated by Charlemagne,

who incorporated their territory into his empire under the name of the Vindish mark. The language of the Sloventzi is a branch of the Servian in the wider sense of this word. At the time of the reformation, Truber and others published parts of the Bible in a Vindish translation, and several other books for religious instruction. Together with Protestantism most of the Vindish books were suppressed under the reign of Ferdinand II., after which for a century little was published, except parts of the Bible, grammars, and dictionaries. In modern times, several works of prose and poetry have been published in the Vindish language by Vodnik, Ravnikar, Jamik, Kumerdey, Popovich, and others. A translation of the whole Bible by Japel, in 5 volumes, was published at Laybach in 1800. The greatest scholar of the Sloventzi, and one of the most eminent Slavists of the age, is Kopitar. The number of the Sloventzi is over 1,000,000, who are all Roman Catholics, with the exception of some 15,000 in Hungary who are Protestants. For them the New Testament exists in a translation by Stephen Kuznicio (Halle, 1771, and St. Petersburg, 1818). The best grammar of their language is by Kopitar (Laybach, 1808); a dictionary has been written by Jamik and Murko (Laybach, 1832).

SLOWACKI, JULIUSZ, a Polish poet, born in Krzemieniec, Volhynia, in 1809, died in Paris, April 3, 1849. He was educated at Wilna, where his father Eusebius Slowacki, an esteemed prose writer, officiated as professor of rhetoric and belles-lettres at the university. He was at Warsaw at the time of the outbreak of the revolution of 1830, and both as a popular bard and a soldier ardently partook in the struggle. The "Song of the Lithuanian Legion" is one of his lyric productions of that time. After the fall of Warsaw he visited Greece and the East, and settled in Paris, whence he made several journeys to Switzerland and Italy. Long a fiery poet of "blind Fate" and sarcastic opponent of the religious movement among the Polish emigration in France, he ultimately became converted to the mystical politico-religious doctrines of Towianski and his apostle Mickiewicz. His works comprise numerous epic, lyric, dramatic, and other productions; among the epics are: *Jan Bielecki*, *Hugo, Lambro*, and "The Arab," and among his dramas: *Mindowe*, *Maria Stuart*, and *Mazepa*.

SLUG (*limax*, Lam.), a genus of mollusks belonging to the air-breathing gasteropods. The form is elongated, tapering, snail-like, the head having 2 long and 2 short tentacles which can be extended and drawn in like the finger of a glove by being turned inside and out; the naked body is covered anteriorly by a coriaceous mantle, under which is the branchial cavity, the respiratory orifice and vent opening on the right side of it, and the generative orifice beneath the right tentacles; the mantle in some contains a calcareous grit, and in others

a small, thin, nail-like shell; when alarmed the head can be partly drawn under the mantle; at the posterior end of the body is a small aperture whence proceed the adhesive threads by which they let themselves down from plants which they ascend in search of food. Their motion is proverbially slow, and effected by the contractions of the flat disk or foot on the ventral surface. The upper jaw is in the form of a toothed crescent, by which they gnaw plants with great voracity; the stomach is elongated; the skin secretes a great quantity of mucosity, which serves to attach them to the surfaces on which they creep; the eyes are small black disks at the end of the posterior tentacles; the sense of touch is delicate. The reproductive season is in spring and summer; they are hermaphrodite, and mutually impregnate each other; the eggs, to the number of 700 or 800, are laid in moist and shady places; they are sensitive to cold, and at the approach of winter burrow into the ground, where they hibernate; they are found under decaying logs and stones in damp places, and in gardens and orchards in evening and early morning, especially after gentle and warm showers. They are found in the northern temperate zones of both hemispheres. The common slug of New England, *L. tunicata* (Gould), is nearly an inch long, varying in color from dark drab to blackish brown; the back is wrinkled, and the upper tentacles granulated and black at the tips; the foot is very narrow; it is found almost always with the isopod crustaceans commonly called sow bugs. Other species are described; they are comparatively rare in the United States, and by no means so troublesome as in Europe. The common European slug (*L. agrestis*, Linn.) is small and unspotted, and very abundant and destructive; they are killed by solutions of tobacco, salt, or other irritants, or by covering a spot infested by them with ashes, lime, fine sand, or any powder which attaches itself to the body and prevents their walking, or they may be arrested by some sticky substance; great numbers are devoured by mammals, birds, and reptiles. The rufous slug (*L. rufus*, Linn.; genus *arion*, Feruss.) is common on the ground in wet weather, and has a shield of calcareous grains with the respiratory orifice toward the anterior part; it is of a reddish color, and sometimes nearly black; a soup made from this species was formerly in great request in pulmonary diseases. The *L. maximosus* (Linn.), found in cellars and dark woods, is of large size, and often spotted or striped with black. Analogous genera are found in Asia. The phosphorescent slug (*L. noctiluca*, Feruss.), of the island of Teneriffe, is more than an inch long, and has a small luminous disk at the posterior part of the shield.

SLUG WORM, the common name of the larvæ of the sawflies, or the hymenopterous insects of the family *tenthredinida*. The slug worm described by Prof. Peck in his prize essay (Boston, 1799), and called by him *ten-*

*thredo cerasi* (Linn.), has been placed by Harris in the genus *selandria* (*blennocampa*). The fly is black, with the first pair of legs yellowish clay-colored; the body of the female is about  $\frac{1}{2}$  of an inch long, that of the male a little smaller. They usually appear in Massachusetts on the cherry and plum trees toward the end of May, disappearing in 3 weeks after laying their eggs singly in incisions on the lower surface of the leaves; the young are hatched in 2 weeks, coming out from June 5 to July 20, according to season; they have 20 short legs, a pair under every segment except the 4th and the last, and are half an inch long when fully grown; in form they resemble small tadpoles, and are covered with a thick slimy matter which has given them the name of slugs; they also emit a disagreeable odor. They come to their full size in 26 days, casting their skin 5 times, after which they enter the ground, change to chrysalids, and come out flies in 16 days; they then lay eggs for a second brood, which enter the ground in autumn, and appear as flies in the ensuing spring, some remaining unchanged for a year longer. They feed on leaves, and in some seasons have been so numerous as to strip trees entirely of their foliage and even cause their destruction; they are eaten by small mammals and birds, and the eggs are destroyed by the larvæ of a tiny ichneumon fly (*encyrtus*). The trees may be best preserved against their attacks by showering them with a mixture of whale oil soap and water, or powdering them with ashes or quicklime.

SMALCALT (Ger. *Schmalkalden*), a town of Hesse-Cassel, in the province and 34 m. E. N. E. from the city of Fulda, at the junction of the Silla with the Smalcald; pop. 5,478. It is an antiquated town, has important manufactures of iron and steel, and there are extensive salt works below the town; but it is principally noteworthy for the Protestant league formed here in the 16th century, and the "Smalcaldic Articles." The Smalcaldic league was concluded Feb. 27, 1531, by 7 princes, 2 counts, and 11 free cities, for mutual defence of their religious and political independence against Charles V. and the Catholic states. It was limited at first to 6 years, but in 1535 new members were admitted at a second convention at Smalcald, and the term extended to 10 years, with a resolution to maintain an army of 12,000 men. The elector John Frederic of Saxony and the landgrave Philip of Hesse became the leaders of the league, whose war against the emperor (1546-'7) was terminated by the victory of the latter at Mühlberg, April 24, 1547.—In 1537 a convention of theologians met at Smalcald and signed a confession of faith drawn up in several articles by Luther, and known subsequently as the "Smalcaldic Articles." They were intended to serve as a representation of the views held by the Protestants to the proposed council of Mantua, which the pope had announced, but which was never held. They

were entirely in conformity with the Augsburg Confession, and were received among the symbolical books of the Lutheran church.

**SMALL POX** (*variola*), a contagious fever, characterized by a pustular eruption having a depressed centre. Though some medical authors are inclined to look on the plague of Athens described by Thucydides as identical with small pox, yet most agree that the disease was unknown to the ancients; for it could scarcely happen that so fatal a disease, the course of which is so strictly limited and the symptoms so strongly marked, could fail to be intelligibly described by the medical writers of antiquity. The terms *variola* and *pæce* first occur in the Bertinian chronicle of the date 961. *Variola* is derived from the Latin *varus*, a blotch or pimple, while pox is of Saxon origin and signifies a bag or pouch; the prefix small was added in the 15th century. The era commonly assigned for the first appearance of small pox is A. D. 569, about the date of the birth of Mohammed; it seems then to have commenced in Arabia, and the raising of the siege of Mecca by an Abyssinian army is attributed to the ravages made by small pox among the troops. The new part which Arabia under Mohammed and his followers was made to play in history contributed to the rapid propagation of the disease throughout the world. Rhazes, an Arabian physician who practised at Bagdad about the beginning of the 10th century, is the first medical author whose writings have come down to us who treats expressly of the disease; he however quotes several of his predecessors, one of whom is believed to have flourished about the year of the Hegira, A. D. 622. Measles and scarlet fever were at first confounded with small pox, or considered as varieties of it; and this error seems to have prevailed more or less until Sydenham finally showed the essential differences between the diseases. Boerhaave was the first to insist that contagion is essential to the propagation of the disease.—The period of incubation, that is, the time that elapses from the moment the patient receives the contagion until it begins to manifest its effect in the initiatory fever, is usually 14 days, though in some cases it may be shorter and in others longer. During this time he commonly remains in his ordinary health. The invasion of the disease is announced by chills followed by fever; this last is apt to be attended with pain in the back, particularly in the loins, and with nausea and vomiting. If the fever runs high, with violent pain in the back and much delirium, the disease commonly assumes a severe form. In children the invasion is often announced by an attack of convulsions. The eruption begins to show itself on the 3d day of the fever. As a rule, to which however there are some exceptions, the eruption shows itself first on the face, then on the neck and wrists, then on the trunk, and finally on the extremities. On the 5th day the eruption is complete, and after this few or no

new spots appear. It at first consists of minute papules or pimples; by the 4th day from their first appearance these papules are converted into vesicles filled with a thin lymph and having a depression in their centre, whence they are termed umbilicated. The vesicles begin now to be surrounded by an areola, which soon becomes of a dark crimson color; the lymph which they contain, at first colorless and transparent, is gradually converted into pus, which increases in quantity and distends their walls until they become hemispherical. About the 8th day of the eruption a dark spot makes its appearance at the centre of the pustule, and gradually dries up and is converted into a scab. When this scab falls it leaves either an indelible cicatrix or a purplish red mark which fades very slowly, and which exposure to a cool atmosphere for a long time renders very distinct. In passing away, the eruption follows the course it took on its first appearance, the scabs first falling from the face, then from the trunk, and last from the extremities.—When the pustules are comparatively few in number, they are separated, sometimes widely, from each other, and the disease is termed discrete (*variola discreta*); when they are very numerous, they touch each other and run together, and then it is termed confluent (*variola conflens*); and between the two a third variety, the semi-confluent or coherent, is often spoken of. In the discrete form the fever commonly subsides on the appearance of the eruption, and when the pustules are few in number it may not return; but where they are at all numerous, their maturation is commonly attended with more or less fever. With the appearance of the eruption on the surface, more or less sore throat is complained of; on examining it, the fauces and tonsils are found red and swollen, and pustules make their appearance upon them, upon the roof of the mouth, and the inside of the cheeks; the patient at the same time is commonly more or less troubled with salivation. When small pox is confluent, the subcutaneous cellular tissue seems involved in the disease, the swelling is very great, and by the 5th day the patient is commonly unable to open his eyes. The eruption on the face sometimes coalesces into one huge sore; it is attended with a tormenting itching, and the fever is of the typhoid kind, the debility being extreme, and the patient restless, sleepless, and often delirious, while the pulse is small, frequent, and feeble. In such cases the accompanying inflammation of the mouth, nasal passages, pharynx, and larynx adds greatly to the distress of the patient and the danger of the disease, sometimes even producing suffocation. The disease is always attended by a peculiar odor, but in confluent cases this is nauseous and offensive to an almost unbearable degree. In this form the fever, which commonly abates on the coming out of the eruption, is aggravated as the eruption approaches maturation. The 8th day of the eruption or the 11th of the disease is commonly the

most fatal day, while more patients die during the 2d week of the disease than either earlier or later. Thus, of 168 fatal cases cited by Dr. Gregory, 27 deaths (nearly  $\frac{1}{2}$  of the whole) took place on the 8th day of the eruption, 32 died in the first week, 99 in the 2d, and 21 in the 3d, and but 16 in the after periods.—When patients recover from severe attacks of small pox, blindness from an intercurrent inflammation of the conjunctiva is an occasional result, and before the general introduction of vaccination blindness from small pox was of very common occurrence. Beside inflammation of the eyes, glandular swellings and abscesses, bed sores, and phlebitis are occasional complications. It is also sometimes complicated with a diseased condition of the blood producing hæmorrhage from various organs, together with petechiæ. These cases are always attended with great debility; the accompanying fever is typhoid, and the eruption itself does not come out freely. They are almost invariably fatal. Pregnancy is a serious complication, although in his own experience the writer has not found it so frequently a fatal one as authors would lead us to expect. Abortion or premature delivery with the death of the child is commonly produced, but the mother frequently recovers. Sometimes the child presents the characteristic eruption of the disease, but this is rare. Still more rarely a mother whose system has been protected by vaccination or a previous attack of the disease, communicates it, after exposure, to the *fœtus in utero*, while she herself escapes. Confluent small pox is always a dangerous disease, and the danger is aggravated if the patient be still in infancy or over 45 years of age, or of a feeble or strumous constitution.—The mortality of small pox is estimated at  $\frac{1}{4}$  or  $\frac{1}{2}$  of all who are attacked; that of the London small pox hospital for the last 50 years has averaged 80 per cent. Like many other contagious diseases, it is subject to epidemic influence, and when it prevails epidemically it seems to be severer and more fatal. It is remarkable that when it is communicated by a minute portion of the virus being inserted under the cuticle by inoculation, as it is termed, the disease is far less violent than if communicated through the atmosphere. When patients are inoculated the mortality is rarely greater than 1 in 600 or 700. Inoculation was introduced into civilized Europe from Constantinople through the sense and courage of Lady Mary Wortley Montagu, but since the discovery of vaccination by Dr. Jenner has been discontinued. (See VACCINATION.)—For a long time the dangers of small pox were aggravated by the means used for its cure; in accordance with the theories of the time, which still have their influence among the vulgar, the eruption was looked upon as an effort made by nature to free the system from morbid matter; the more abundant it was, the better for the patient. The eruption was accordingly encouraged by warm drinks and a heated atmo-

sphere. Sydenham was the first to inculcate the necessity of free ventilation and a cooling regimen. Mild cases of small pox require little except attention to hygienic measures; the disease is attended with little danger, and should run its course uninfluenced by art. When it is severe, attention should be early directed to supporting the strength of the patient. The diet should be as nutritious as he can bear, and, when indicated by the pulse, wine and stimulants should be freely administered. The troublesome itching, which causes great suffering, may be alleviated by the application of sweet oil, cold cream, or lard; opiates may be useful to procure sleep, and the bowels should be occasionally moved by mild laxatives or enemata. Small doses of opium relieve many of the antecedent symptoms of small pox, such as headache, backache, vomiting, &c., and facilitate the outbreak of the eruption. Magnesia ointment, made of 1 drachm of magnesia to 1 ounce of simple cerate, is a very cleanly and efficient application to the face in small pox; the scabs should be removed as soon as they will come off easily, and the ointment applied several times a day.

SMALT, a fine blue color prepared from glass colored by oxide of cobalt. It is largely used in painting and in printing earthenware. (See COBALT, vol. v. p. 403.)

SMART, CHRISTOPHER, an English classical scholar and poet, born at Shipbourne, Kent, April 11, 1722, died in the king's bench prison, London, May 22, 1771. He was educated at Cambridge, and elected a fellow of Pembroke hall in 1745, and gained the Seatonian prize for poems on the Supreme Being for 5 years consecutively. In 1752 he married, removed to London, and commenced author. Through intemperance and the troubles of extreme poverty he lost his reason, and was confined in a lunatic asylum for two years; but he had intervals of sanity, and during these he made prose translations of the Psalms, of Phædrus, and of Horace. He wrote the "Hilliad," a satire on Sir John Hill, who had criticized his writings, and in 1752 published a collection of his poems, to which he afterward made additions. A posthumous edition appeared in 1791, but they are now deservedly forgotten.

SMEATON, JOHN, an English civil engineer, born at Austhorpe, near Leeds, June 8, 1724, died there, Oct. 28, 1792. From early childhood he exhibited a decided taste for mechanics, and before he reached his 15th year had made some mechanical inventions and discoveries of considerable importance. In 1742 he went to London to study law, which after a little time his father allowed him to relinquish and devote himself to mechanics and engineering. In 1750 he took up the business of a mathematical instrument maker, and in 1751 invented a machine for measuring a ship's way at sea. In the two years following he made a series of experiments "concerning the natural power of water and wind to turn mills and



other machines depending on circular motion," and he read a paper on this subject before the royal society. From this investigation resulted some valuable improvements in hydraulic machinery, increasing the power one third, for which the royal society in 1759 bestowed on him the Copley gold medal. In 1754 he visited Holland and Belgium, and examined carefully their system of canals, dikes, locks, and passage boats; and in 1759 he communicated to the royal society the results of an investigation by which he had reduced the art of designing wind mills to general principles. The Eddystone lighthouse being destroyed by fire in 1755, Smeaton, on the recommendation of Lord Macclesfield, president of the Royal society, was employed to rebuild it. (See LIGHTHOUSE, vol. x. p. 523.) This extraordinary piece of engineering established Smeaton's reputation, and he was constantly employed for many years in the construction or planning of important works; he built canals and locks on the Derwentwater estate, constructed the great canal from the Forth to the Clyde, improved the Calder navigation, supplied Greenwich and Deptford with water, erected the Spurn lighthouse, greatly improved Ramsgate harbor, preserved the old London bridge, and erected a number of fine bridges in Scotland. In 1785 he withdrew from business, but was consulted in almost every important work till his last sickness. He published a volume on the Eddystone lighthouse (1791), and his professional reports were published in 1812 by the institution of civil engineers in 3 vols. 4to., to which a 4th was afterward added.

SMELL, the sense by which we take cognizance of odors, and of which the nose is the recipient organ. Odorous emanations are generally believed to consist of material particles of extreme minuteness disseminated in the air. The true sense of smell is confined to the upper portion of the nasal cavity, where the 1st or olfactory nerve is distributed; the lower portions of this cavity belong to the respiratory passages, and have only the ordinary sense of touch from the branches of the 5th or trifacial nerve; the epithelium is dark brown and very thick and pulpy in the olfactory region; the nervous filaments form a considerable part of its thickness, and differ from ordinary cerebral nerves in containing no characteristic white substance, in not being divisible into elementary fibrillae, and in being nucleated and finely granular in texture; they seem to be direct continuations of the gray vesicular matter of the olfactory bulb, a "portion of the nervous centre put forward beyond the cranium, in order that it may there receive, as at first hand, the impressions of which the mind is to become cognizant." The olfactory nerve conveys no motor influence to any muscles, and confers no common sensibility on the mucous membrane. (For the general structure of the nasal passages see NOSE.) That odors may be transmitted through water as well as air seems proved by

the large size of the olfactory ganglia in fishes; but it is probable that the air contained in the water is the vehicle of communication. Odorous particles must be introduced within the olfactory cavity, and to its upper portion for their full appreciation; hence they are more quickly perceived when the wind is blowing from an odorous body, and less when from the opposite direction, as is familiar to all hunters. There is no definite perception of odors unless the mind is directed thereto; we do not smell if we breathe through the mouth, and a too dry or a too humid surface is unfavorable for acute perception, as we know in the 1st and 2d stages of a common cold in the head. A great part of the sense of taste, and all of it which pertains to the perception of flavors, belongs properly to smell. (See TASTE.) This sense varies much in individuals, and in the same individual at different times; it is more acute in some mammals than in others, and in most much more so than in man; some animals appreciate odors imperceptible to us, and others seem either not to notice or even to enjoy such as we consider dangerous or disgusting; the carnivora are very susceptible to animal scents, and slightly so to those of plants and flowers, while the herbivora are most sensitive to the latter; while man has less acute smell than most animals, his sphere of susceptibility to both agreeable and disagreeable odors is far more extended. The abundant supply of blood vessels warms the air entering the nose or mouth, and the numerous glandulæ afford the mucous secretion whose presence is necessary to perfect smell. Division of the olfactory bulb destroys the power of appreciating odors, though irritating substances may be perceived by the sensory fibres of the 5th pair of cerebral nerves; division of the 5th pair may impair smell by interfering with the secretions of the sensitive membrane. The uses of this sense in animals are to indicate the direction and presence of food, to discriminate its qualities, and to inform them of the approach of enemies; it is always situated in the neighborhood of the mouth. In man it does not serve in the selection of food, giving no warning of noxious qualities, and often directly leading to the use of deleterious substances; it is more acute in savage than in civilized man, and highly so in all races when other senses, whether of sight or hearing, are deficient; it is often singularly exalted in diseased states, and in some cases of somnambulism. Some men are sensitive to one odor and not to another; asafoetida and garlic, exceedingly offensive to most persons, are agreeable to some, and what was once repugnant, like the *fumet* sought after by the epicure, by habit becomes desirable; there are many other singular idiosyncrasies. The organ of smell in air-breathing vertebrates corresponds with that of man in all essential particulars of structure, and its efficiency may generally be measured by the size of the olfactory ganglia and nerves; the

cetaceans, in which the nasal passages are devoted to the ejection of the water taken in with the food as well as to respiration, have an obtuse sense of smell, and the dolphin family are believed to be destitute of it; in fishes the organ is not connected with the mouth, but is a cavity by itself, with single or double nostrils; insects, some mollusks, and crustaceans seem to possess the sense in considerable perfection, and various organs have been considered as used for its purposes. (See INSECTS, and MOLLUSCA.)

**SMELT**, a soft-rayed fish of the salmon family, and genus *osmerus* (Artedi). The body is elongated and covered with small scales; there are 2 dorsals, the 1st with rays and the 2d adipose and rayless; ventrals under the anterior rays of dorsal; teeth on the jaws and tongue very long, and on the premaxillaries small and hooked; gill openings wide; air bladder silvery within. The common American smelt (*O. mordax*, Les.) is about 10 inches long; the upper parts with the dorsal and caudal fins are yellowish green with coppery reflections, with very minute black dots; sides silvery white; abdomen and lower fins milky white; gill covers golden. It is found from New York to Labrador, going up rivers in early spring and returning to the sea late in autumn, at which times immense quantities are taken by hook and nets; the flavor is very delicate, and they are highly esteemed, being mostly eaten fresh; when transferred from salt into fresh water, they have become permanent residents in Champlain, Squam, and Winnipiseogee lakes, and in Jamaica pond near Boston; they are smaller and more slender than the marine smelt. From the vicinity of Bath, Me., at least 100 tons of these fish are annually sent to the Boston and New York markets; as they will average 15 to the pound, this would give 3,000,000 smelts from a single locality. The European smelt (*O. eperlanus*, Art.) is from 7 to 9 inches long, lighter colored above, with thicker body and narrower head. They are found in all the rivers opening into northern seas; they are the *éperlans* of the French and the spirling or spurling of the English; when recently taken from the water, they have a sweetish, not disagreeable, and cucumber-like odor, from which the generic and the common names are derived. Smelts eat small fish, crustaceans, and mollusks, and they are themselves devoured by sharks and other predaceous fishes.

**SMELTING**. See COPPER SMELTING, IRON MANUFACTURE, LEAD, and SILVER.

**SMEW** (*mergellus albellus*, Selby), a web-footed bird differing from the typical mergansers, to which sub-family it belongs, in having the bill much shorter than the head and elevated at the base, and the mandibles with short and closely set lamellæ. It is about 17½ inches long, and 27 in alar extent; the general color is white, whence its common name of white nun; around the eyes, a patch on each side of the nape, semi-collar on each side of lower

neck, middle of back, tail, and wings black; scapulars, middle wing coverts, tertials, and secondary tips white; in the female the head is reddish brown. It is found in the northern parts of the old world, in winter coming down to central Europe, frequenting the sea coast, lakes, and rivers; it is an expert swimmer and diver, and feeds on fish and crustaceans; the nest is made near the water, and the eggs are 8 to 12; like other mergansers it hybridizes with the ducks, especially with the genus *clangula* (Flem.). It is generally believed to be accidental in America, only a single female specimen having been obtained by Audubon, near New Orleans; the bird stated by Wilson to be this was probably the buffle-head (*clangula americana*, Bonap.).

**SMIBERT**, or **SMYBERT**, JOHN, a Scottish painter, born in Edinburgh about 1684, died in Boston, Mass., in 1751. Having attained a respectable position as a portrait painter in London, whither he had repaired early in life, he was induced in 1728 to accompany Dean Berkeley to America; and upon the failure of the benevolent scheme devised by the latter, he settled in Boston. He painted most of the contemporary worthies of New England and New York, and, according to Dunlap, exercised a considerable influence upon Copley and Trumbull. His most celebrated painting is a large portrait piece representing Berkeley and several members of his family, together with the artist himself, on their first landing in America. It is now in the possession of Yale college.

**SMIRKE**, SIR ROBERT, an English architect, born in London in 1780. He is the oldest son of Robert Smirke, a popular *genre* painter. After a tour of observation and study through Germany and southern Europe, he established himself in London in 1805 as an architect. He brought himself early into notice by his design for Covent Garden theatre (1808-'9), which was destroyed by fire in March, 1856. Subsequently he was employed in designing many public buildings in the metropolis, the most considerable being the mint, a Grecian Doric edifice erected in 1811; the post office (1823-'9); the college of physicians; King's college, as the eastern wing of Somerset house; and the British museum. These were all in the classical style. His chief Gothic works are the restorations of York minster and the improvements and extensions of the Inner Temple. He also erected buildings for the United Service, Carlton, and Oxford and Cambridge clubs, the last in conjunction with his brother, Sydney Smirke. He has been a royal academician since 1812, and in 1831 received the honor of knighthood. He is the author of "Specimens of Continental Architecture" (fol., London, 1806).—SYDNEY, younger brother of the preceding, is also a prominent architect. His style is more ornate and florid than that of his brother, and has been employed with effect upon several of the London club houses, especially the new Carlton in Pall Mall.

He also directed the restorations of the Temple church and Lichfield cathedral, and is at present the architect of the British museum, the reading room in the inner quadrangle of which is his chief professional effort. He has published a 4to. volume entitled "Architecture of the Temple Church."

SMITH. I. A central co. of Miss., intersected by Strong river, and drained by the head streams of Leaf river; area, 620 sq. m.; pop. in 1860, 7,638, of whom 2,195 were slaves. The surface is nearly level and the soil poor. The productions in 1850 were 128,641 bushels of Indian corn, 46,450 of sweet potatoes, and 1,111 bales of cotton. There were 10 churches, and 174 pupils attending public schools. Capital, Raleigh. II. A N. E. co. of Texas, bounded N. by the Sabino river, and E. by the Neches, and drained by the sources of the Angelina; area, 990 sq. m.; pop. in 1860, 13,395, of whom 4,982 were slaves. The greater portion of the surface is prairie land, and the soil is fertile. The productions in 1850 were 125,565 bushels of Indian corn, 30,820 of sweet potatoes, 115 bales of cotton, and 29,920 lbs. of butter. There were 7 churches, and 130 pupils attending public schools. Capital, Tyler. III. A N. co. of Tenn., intersected by the Cumberland river and drained by Caney fork; area, 860 sq. m.; pop. in 1860, 16,357, of whom 4,228 were slaves. The surface is rough, but the soil generally fertile. The productions in 1850 were 1,066,410 bushels of Indian corn, 97,755 of oats, 2,377,394 lbs. of tobacco, 122,972 of butter, and 30,881 of wool. There were 5 grist mills, 7 saw mills, 5 tanneries, 50 churches, and 1,718 pupils attending public schools. Capital, Carthage.

SMITH, ADAM, a Scottish philosopher, born at Kirkcaldy, Fifeshire, June 5, 1723, died in Edinburgh, July 17, 1790. Being of weak constitution, and his father having died before his birth, he was carefully and indulgently brought up by his mother. At the grammar school of Kirkcaldy he attracted notice by his passion for books and extraordinary memory, and by habits of abstraction in company and of talking to himself, which adhered to him through life. From his 14th to his 17th year he pursued his studies at the university of Glasgow, devoting himself especially to mathematics and natural science, and attending the lectures of Dr. Hutcheson on moral philosophy. Intended for the church of England, he went in 1740 to Baliol college, Oxford, as an exhibitor on Snell's foundation, remained there 7 years, became intimately acquainted with Greek, Latin, French, and Italian literature, and aimed at a mastery of the niceties of the English language. He was severely reprimanded for reading privately Hume's "Treatise on Human Nature." Abandoning the project of taking orders, he returned to Kirkcaldy, and in 1748 fixed his residence in Edinburgh, where under the patronage of Lord Kames he delivered lectures on rhetoric and belles-lettres, the

first course on polite literature ever given in a Scottish university. None of them have been published, but they established his literary reputation, and he was elected in 1751 professor of logic in the university of Glasgow, and was transferred in the following year to the chair of moral philosophy in the same university, which he filled nearly 12 years, the happiest, as he declared, of his life. His course was divided into 4 parts. The first treated natural theology; in the second, devoted to ethics, he developed the doctrines contained in his "Theory of Moral Sentiments;" in the third, the subject of which was justice, he traced the gradual progress of jurisprudence and government; and in the fourth, the subject of which was expediency, he examined those political regulations which relate to commerce, finances, and ecclesiastical and military establishments, and which are calculated to increase the power and prosperity of a state. The last division included the substance of his work on the "Wealth of Nations." His lectures were generally delivered extempore, and attracted a multitude of students, while his opinions became prominent subjects of discussion in clubs and literary societies. His first publications were articles in the "Edinburgh Review," begun in 1755, of which two numbers only appeared. He published in 1759 his "Theory of Moral Sentiments," which he had elaborated with the greatest care, and in which he maintains the doctrine that all moral emotions and distinctions spring from sympathy. It gave him a wide reputation as a moralist and writer. (See MORAL PHILOSOPHY, vol. xi. p. 717.) From this time he devoted a larger proportion of his lectures to jurisprudence and political economy. Near the close of 1763 he resigned his professorship to accompany the young duke of Buccleugh on his travels. They visited Paris, resided 18 months at Toulouse, passed two months at Geneva, and returning to Paris at the end of 1765 remained there nearly a year. Turgot, Quesnay, Necker, D'Alembert, Helvetius, Marmontel, the abbé Morellet, Buffon, D'Holbach, Mme. Riccoboni, and Mlle. de Lespinasse were among his acquaintances. From the duke de la Rochefoucauld he received particular attention, notwithstanding the severe judgment which he had passed on the maxims of his grandfather. To Quesnay, but for his death, he would have dedicated the "Wealth of Nations." He returned with his pupil to London in Oct. 1766, and soon after fixed his residence for 10 years with his mother at Kirkcaldy, engaged in severe study, and occasionally visiting Edinburgh and London, where he met with the best literary society. For many years he had enjoyed an intimate friendship with Hume, "on both sides founded on the admiration of genius and the love of simplicity;" but the latter vainly sought to withdraw him from his retirement by representing the town as the proper scene for a man of letters. In 1776 appeared his

long matured and important work, entitled "Inquiry into the Nature and Sources of the Wealth of Nations." (See *POLITICAL ECONOMY*, vol. xiii. p. 449.) Mr. Buckle affirms that "Adam Smith contributed more, by the publication of this single work, toward the happiness of man, than has been effected by the united abilities of all the statesmen and legislators of whom history has preserved an authentic account." It received several additions in the 8d edition (1784), but the 4th edition (1789) was unchanged. It was translated into the principal European languages, referred to in the house of commons, and its author consulted by the minister. He resided for two years after its publication chiefly in London; was appointed in 1778 one of the commissioners of customs for Scotland; and afterward removed to Edinburgh, where he resided during the remainder of his life. Occupied with official duties, he published nothing more, and the materials which he had collected on the principles of law and government and on other subjects were, excepting 6 detached essays that appeared posthumously, destroyed by his order just before his death. In 1784 the death of his mother, who had accompanied him to the capital, severely afflicted him; he was never married, and he suffered another bereavement in 1788 by the death of his cousin Miss Douglass, who superintended his household; and his death occurred after a lingering and painful illness. In 1787 he had been elected lord rector of the university of Glasgow. The state of his fortune confirmed what his most intimate friends had suspected, that a large proportion of his savings was allotted to offices of secret charity. His library, which he prized very highly, included about 5,000 well selected volumes, most of them elegantly bound; and he remarked to one of his friends that he was "a beau in nothing but his books." He generally wrote by dictation to an amanuensis, and he allowed very few notes or references to authorities in his publications, regarding them as blemishes. "That there were many peculiarities," says Dugald Stewart, "both in his manners and in his intellectual habits, was manifest to the most superficial observer; but although, to those who knew him, these peculiarities detracted nothing from the respect which his abilities commanded, and although to his intimate friends they added an inexpressible charm to his conversation, while they displayed in the most interesting light the artless simplicity of his heart, yet it would require a very skilful pencil to present them to the public eye. He was certainly not fitted for the general commerce of the world, or for the business of active life. The comprehensive speculations with which he had been occupied from his youth rendered him particularly inattentive to familiar objects and to common occurrences; and he frequently exhibited instances of absence which have scarcely been surpassed by the fancy of *Bruyère*."

SMITH, ALBERT, an English author, born at Overtsey, May 24, 1816, died at Fulham, near London, May 23, 1860. He was educated in the merchant tailors' school, and being intended for the surgical profession, to which his father belonged, walked the hospitals in London, and also studied at Paris. He subsequently joined his father in practice, but was soon led by his literary tastes to become a writer for the periodical press. Settling in London in 1841, he became a contributor to "Bentley's Magazine," and within a few years produced "The Wassail Bowl," "The Adventures of Mr. Ledbury," "The Scattergood Family," "The Marchioness of Brinvilliers," "Christopher Tadpole," and "The Pottleton Legacy." He was also engaged for some time upon "Punch," his contributions to which included "The Physiology of Evening Parties," "The Medical Student," and other light varieties; and in 1847-'9 he produced a number of amusing trifles entitled "The Natural History of the Gent," "The Natural History of the Ballet Girl," "Stuck-up People," &c. He also wrote Christmas adaptations from the tales of Dickens, burlesques, and other stage pieces. A journey to Constantinople in 1849 furnished him with materials for his "Month at Constantinople," and also for the public entertainment called the "Overland Mail," which he first brought out in May, 1850. In August, 1851, he made the ascent of Mont Blanc, and his entertainment founded thereon proved the most successful venture of his literary career, having on May 3, 1855, been given for the thousandth time; and it retained an undiminished hold upon popular favor when in 1858 the author departed for China. Upon returning to England he gave a Chinese entertainment, which in the spring of 1860 was replaced by the more popular story of Mont Blanc. This he continued to repeat until within two days of his death, which was caused by inflammation of the lungs after an attack of apoplexy. His latest literary compositions were those contributed to the "Cornhill Magazine." He wrote little however during the last 10 years of his life, his entertainments, by which he realized a handsome fortune, having absorbed the greater part of his time.

SMITH, ALEXANDER, a Scottish poet, born in Kilmarnock, Dec. 31, 1830. He is the son of a pattern designer in his native town, and was destined for the clerical profession. Circumstances having occurred to defeat this project, he became a pattern designer for a lace factory in Glasgow, and about the age of 17 began to exercise his talents in metrical composition. In 1852 he was introduced to the general public through the columns of the "Critic" and the "Eclectic Review," in the former of which appeared in instalments his poem of the "Life Drama." In 1854 he was appointed secretary of the university of Edinburgh, and about the same time delivered a series of public lectures, one of which, on

"Burns as a National Poet," was much commended. He has since published "Sonnets of the War," in conjunction with Sydney Dobell, "City Poems" (1857), and "Edwin of Deira" (1861); and he is a frequent contributor to the periodical press.

SMITH, GERRIT, an American philanthropist, born in Utica, N. Y., March 6, 1797. He is the son of Peter Smith, known in the early part of the present century as one of the largest landholders in the United States. He was graduated at Hamilton college, Clinton, N. Y., in 1818. His principal occupation has been the management of the large landed estate left by his father. Though never a student at law, he was in 1853 admitted to practice in the state and federal courts of New York, and has participated in several important trials. At an early age he began to take an active part in the benevolent enterprises of the day, and in 1825 connected himself with the American colonization society, from the hope that the success of its projects would lead to speedy emancipation. He gave largely for the accomplishment of its objects; but in 1835 he withdrew from it and connected himself with the American anti-slavery society. Though by inheritance and purchase from his fellow heirs he was one of the largest landholders in the United States, he nevertheless became strongly opposed to land monopoly, and practically illustrated his sentiments by distributing 200,000 acres, partly among institutions of learning, but mostly among the poor white and black men, in parcels averaging nearly 50 acres. His largest gifts of money have been in aid of emancipation, and to enable the poor to buy homes. In 1852 Mr. Smith was elected to congress from the district comprising the counties of Oswego and Madison; but at the close of the first or long session he resigned on account of the pressure of his private affairs, and also on account of his disrelish for public life. For many years he has advocated, both by public speeches and by published essays and appeals, a larger liberty of opinion, and freedom from what he believes the bondage of sect. In 1861 Mr. Smith made a few speeches in behalf of a vigorous and uncompromising prosecution of the war in which his country was involved, and also wrote many articles to this end for the press. Mr. Smith has published numerous pamphlets, speeches, addresses, &c., but few of these have been collected in permanent form. In 1856 a volume of his speeches in congress was published in New York, and in 1861 another volume was issued, entitled "Sermons and Speeches, by Gerrit Smith."

SMITH, HENRY BOYNTON, D.D., an American clergyman, born in Portland, Me., Nov. 21, 1815. He was graduated at Bowdoin college in 1834, and was a tutor there in 1836-'7, and in 1840-'41; studied theology at Andover and Bangor, and subsequently at Halle and Berlin; was pastor of the Congregational church in West Amesbury, Mass., from 1842 to 1847;

was professor of mental and moral philosophy in Amherst college from 1847 to 1850; professor of church history in the Union theological seminary, New York, from 1850 to 1855; and has been since 1855 professor of systematic theology in the same institution. Prof. Smith revised and edited, with valuable additions, the Edinburgh translation of Gieseler's "Church History" (3 vols. 8vo., New York, 1849-'57), and translated the 4th volume. In 1859 he published "The History of the Church of Christ in Chronological Tables; a Synchronistic View of the Events, Characteristics, and Culture of each Period, including the History of Polity, Worship, Literature, and Doctrines" (atlas folio, New York). In 1860 he published a "Memorial of Anson G. Phelps" (12mo., New York), and in 1860-'62 a revised English edition of Hagenbach's "History of Christian Doctrines" (2 vols. 8vo.), with additions rendering it the most complete and valuable work extant on that subject. Prof. Smith has been for many years a large contributor to the religious periodical literature of the country, and since 1859 editor of the "American Theological Review." Beside the books we have named he has published numerous addresses, orations, and occasional sermons, some of which have excited considerable attention; among these are: "The Relations of Faith to Philosophy," an address before the Porter rhetorical society, Andover (1849); "The Nature and Worth of the Science of Church History, an Inaugural Address" (New York, 1851); "The Idea of Christian Theology as a System, an Inaugural Address" (New York, 1855); "The Reformed Churches of Europe and America," delivered before the Presbyterian historical society (St. Louis, 1855); "An Argument for Christian Colleges" (1857); and an oration on "Æsthetics, or the Science of the Beautiful," before the Phi Beta Kappa society of New York university (1861). He has also contributed to this cyclopædia, among others, the articles on Calvin, Hegel, Kant, the Reformed Church, and Schelling.

SMITH, JAMES, one of the signers of the declaration of independence, born in Ireland about 1719, died in York, Penn., July 11, 1806. He came to America with his father's family in 1729, studied law with his brother George in Lancaster, Penn., and after his admission to practice removed to the neighborhood of Shippenburg, and engaged in the occupation of surveying. After a few years he removed to York, which became his permanent home, and entered upon the legal profession. His extensive practice, abilities, and eloquence enabled him to exert a powerful influence in behalf of the rights of the colonies, and in 1774 he was chosen a deputy to attend the provincial meeting, or rather "Committee for the Province of Pennsylvania," which convened at Philadelphia July 15. At this meeting he was one of those who were appointed to "prepare and bring in a draught of instructions to the representatives in assembly met;" and these "Instructions,"

together with Smith's "Essay on the Constitutional Power of Great Britain over the Colonies in America," gave the first strong impulse to the cause of the revolution in that region. He continued to take a prominent part in all provincial movements, and in 1776 was chosen a member of the continental congress, in which he continued till 1778; and when congress held its sessions in York, the board of war occupied his law office. In 1780 he was elected a member of the general assembly of Pennsylvania.

SMITH, JAMES and HORACE, English authors, whose names are commonly associated together in literary history. The former was born in London, Feb. 10, 1775, and died there, Dec. 24, 1839; and the latter was born in London, Dec. 31, 1779, and died at Tunbridge Wells, July 12, 1849. They were the sons of Robert Smith, a legal practitioner of London, who held for many years the office of solicitor of the ordnance, and were early trained to an active business life, James in the professional business of his father, to whose office he eventually succeeded, and Horace as a member of the stock exchange. Soon after the commencement of the 19th century they began, under the advice and encouragement of Cumberland the dramatist, to write for a variety of magazines and newspapers. The poetical imitations entitled "Horace in London," originally contributed to the "Monthly Mirror," and afterward republished in England and America, were written principally by James Smith. In 1812 the rebuilding of Drury Lane theatre led to the offer of a prize by the committee for an opening address. At the suggestion of a friend the brothers, in 6 weeks, completed a series of parodies on the popular authors of the day, taking this subject for their theme; thus arose the well known volume of "Rejected Addresses," which has passed through an almost unprecedented number of editions in England and America. In the preface to the 18th edition (1833), by Horace Smith, the writer states that Scott once remarked to him in allusion to portions of the "Tale of Drury Lane" travestied from "Marmion": "I must certainly have written this myself, although I forget upon what occasion." Contented with the reputation which this enterprise had brought him, James Smith during the remainder of his life wrote anonymously for amusement or relief, contributing *vers de société* and epigrams to the magazines or annuals, or assisting Charles Mathews the actor in the preparation of his "Country Cousins," his "Trip to France," and other so called "entertainments." Horace, on the contrary, was attracted by the success of the "Rejected Addresses" to devote himself more closely to literature; and subsequent to 1820, when he retired from business, he was for 25 years one of the most industrious authors of England. In 1825 appeared "Brambletye House," his first and best novel. It was succeeded by "Tor Hill," "Reuben Apsley," "Jane Lomax," "The New Forest," and other

novels, few of which are now known outside of the circulating libraries; and in 1845 the author took a formal leave of the public in the preface to "Love and Mesmerism." Shelley spoke with enthusiasm of Horace Smith's "wit and sense," and generosity; and Leigh Hunt has declared that, with the single exception of Shelley, he never met with a finer nature in man. A selection from the poetical works of Horace and James Smith, including the "Rejected Addresses," with a memoir by Epes Sargent, was published in New York in 1857.

SMITH, SIR JAMES EDWARD, M.D., an English botanist, born in Norwich, Dec. 2, 1759, died there, March 17, 1828. He studied medicine at Edinburgh, and in 1782 received Dr. Hope's gold medal for the best botanical collection; and soon afterward he became the possessor by purchase of the books, manuscripts, and herbarium of Linnæus. He commenced the practice of his profession in London, but soon made an extensive tour on the continent occupying some years, received the degree of M.D. at Leyden, and in 1788 founded the Linnæan society of London, of which he was the first president. In 1796 he returned to Norwich, though he lectured on botany for two months each year at the royal institution. He wrote "English Botany" (36 vols., with 2,592 colored figures by Sowerby, London, 1792-1807); *Flora Britannica* (3 vols., 1800-1804); "The English Flora" (4 vols.); *Flora Græca* (1808); *Prodromus Floræ Græcæ* (1808), &c. He was also the author of most of the botanical articles in Rees's "Cyclopædia."

SMITH, JOHN, the founder of Virginia, born in Willoughby, Lincolnshire, in 1579, died in London in 1631. He was of highly respectable parentage, and received his first education in the free schools of Alford and Louth. At the age of 13 he sold his books, satchel, and whatever else he had, with the intention of going privately to sea; but the death of his father, who left him a respectable estate, prevented him from carrying his scheme into effect. At the age of 15 he entered a counting house at Lynn; but soon quitting his master's business, with 10 shillings furnished by his friends, as he says, "to get rid of him," he accompanied a son of Lord Willoughby to France. At Orleans he was dismissed, but instead of returning to England, he made his way to the Low Countries, and participated in the wars then raging in that part of Europe. After remaining there 4 years he embarked for Scotland, and thence soon returned to Willoughby. Here he retired to a forest, in which he built himself a lodge of boughs, and occupied his time in hunting, horsemanship, and the study of military history and tactics. But his love of adventure returning, he repaired a second time to the Low Countries, where he formed a resolution of joining the armies engaged in fighting with the Turks; and after having been robbed, and only escaped dying of want on several occasions by soliciting alms, he at last reached Mar-

seilles, where he embarked for Italy. A violent storm having arisen, the pilgrims who were in large numbers on the vessel deemed it a mark of the displeasure of Heaven at the presence of a heretic, and Smith was thrown into the sea. Swimming to the isle of St. Mary, not far distant, he was taken on board a French ship, with which he visited Alexandria and the coast of the Levant. During the voyage they met with a Venetian argosy richly laden, and in the engagement which followed Smith distinguished himself highly, and received a large reward as his share of the prize. He afterward made the tour of Italy, but, never abandoning his original purpose, went to Gratz in Styria in 1601, and joined as a volunteer the army of Baron Kissell, which was attempting to relieve the garrison of a Transylvanian town, besieged by 20,000 Turks. Through Smith's contrivance a communication was opened with the fortress, a combined assault was planned and successfully carried into execution, and in consequence the Turks gave up the siege. For this exploit he was put in command of a troop of 250 horse in the regiment of Count Meldritch. In a subsequent battle he was severely wounded, and had a horse shot under him; and in another siege he met and killed in single combat 3 Turkish champions. For these exploits he was made major in his regiment, and received from the prince of Transylvania a patent of nobility and a pension of 300 ducats. Later in the war he was wounded and taken prisoner, and sent as a slave to Constantinople. Here he secured the affection of his young mistress, who fearing for his safety sent him to her brother, Timour, pasha of Nalbritz on the sea of Azof, with a letter, in which she frankly stated her feelings. The Tartar prince, indignant at the disgraceful attachment of his sister to a Christian, employed Smith to thresh corn in his country house, and one time insulted him so grossly that Smith beat out his brains with the flail. Arraying himself in the dead man's clothes, and mounting his horse, he rode to the desert, and for 2 or 3 days wandered without end or aim. He struck at last the main road leading into Russia, and after a wearisome journey of 16 days reached a Russian garrison on the Don. There he was kindly treated and well provided for, and from thence journeyed to Transylvania, where he was received with honor by his old companions in arms; and after having been furnished with money to repair his losses, he started for England. On his way he travelled through Germany, France, and Spain; and hearing that a civil war had sprung up in Barbary, he went to Morocco with the intention of taking part in it, but, becoming disgusted with both parties, left the country in the same ship in which he came. The vessel was attacked on the voyage by two Spanish men-of-war, but succeeded in escaping, and about 1604 Smith returned to England. At this time all Europe, and especially all England, was agitated by the stirring discov-

eries in the new world. Capt. Gosnold, a brave and experienced navigator, had already explored the coasts of the new continent, and easily persuaded Smith to engage in the founding of a colony. A royal patent was issued in 1606, granting leave to certain individuals "to deduce a colony into Virginia," and on Dec. 19 of that year the expedition, consisting of 3 vessels, under the command of Newport, and carrying 105 men, set sail. By the charter the local government was placed in the hands of a council, the members of which were appointed and removable at the pleasure of the crown; their names were placed in a sealed box, not to be opened until their arrival in Virginia. On the voyage dissensions sprung up among the leaders, and much enmity was manifested against Smith by some of his associates, who were envious of his popularity, and perhaps irritated by his haughty and uncompromising spirit. At the Canaries he was charged by Wingfield and others with a conspiracy to murder the council, usurp the government, and make himself king of Virginia, and was in consequence kept a prisoner during the remainder of the voyage. After they had landed, and it was determined to form a settlement about 40 miles from the mouth of James river, the sealed box was opened; and though Smith was named one of the council, he was excluded by the other members on the charge of sedition. He did not however allow his disappointment to destroy his devotion to the interests of the colony. Along with Newport he headed a party of 20 men sent to discover the source of the James. About 6 weeks after, when Newport was on the point of returning to England, the enemies of Smith urged him to return and be reprimanded by the council in England, rather than to suffer the disgrace of a public conviction in the new settlement. But Smith felt himself strong in the affections of most of the colonists, and still stronger in his innocence. The trial which he demanded and obtained resulted in his triumphant acquittal and the signal discomfiture of his enemies, and he was then made a member of the council. Living on bad and scanty food, the members of the colony were soon reduced by disease. The president, Wingfield, embezzled their stores and was deposed, Ratcliff being made his successor. But the energy and varied experience of Smith now gave him his proper position. He became the real head of the government, and to his efforts, almost unaided as they were, the salvation of the infant colony was owing. He set about the building of Jamestown, and, after providing the colonists with lodgings, made excursions into the neighboring country to obtain a supply of corn. "The Spaniards," we are told, "never more greedily desired gold than he victuals, nor his soldiers more to abandon the country than he to keep it." On one occasion Wingfield and Kendall made preparations to escape to England with some



malcontents; but the sudden arrival of Smith prevented the plan from being carried into execution, although it was found necessary to resort to arms. On one of his expeditions in search of corn he was taken prisoner by the Indians, but his life was saved by the interference of Pocahontas. (See POCAHONTAS.) He was sent back by Powhatan to Jamestown, and after an absence of 7 weeks found "all in combustion" on his return. The colony was reduced to 40 men, and the larger portion of these had determined to return. This attempt Smith prevented by his decisive action and at the hazard of his life; and the arrival of Newport with 120 men revived the drooping spirits of the colonists. In June, 1608, Smith set out on an expedition to explore Chesapeake bay, and, after making a survey of the coasts as far as the mouth of the Patapsco, returned to Jamestown on July 21. The colonists he again found discontented and spiritless, and being indignant at the conduct of their president Ratcliff, they insisted that Smith should take his place. On July 24 he started on another expedition, leaving Scrivener as deputy. In the course of this voyage he explored the head of the Chesapeake, and returned to Jamestown on Sept. 7. In these two voyages Capt. Smith sailed, according to his own computation, about 3,000 miles, and from his surveys constructed a map of Chesapeake bay and the country bordering upon it, which is still extant, and, considering the circumstances, very accurate. On Sept. 10 he was formally inaugurated as president of the colony, and immediately set about the duties of his administration. The men were regularly drilled in military exercises, and buildings were repaired or erected. In a short time Newport arrived from England with a number of colonists; and being charged not to return without discovering the South sea, he had brought over for the purpose a barge which could be taken apart and put together again. Smith vainly objected to this inland expedition, which was a total failure: On their return they were immediately set to work by the president, who obliged every man to labor 6 hours a day. By Newport he sent back a frank and spirited reply to the council in England, the members of which were governed by a policy which looked to sudden emoluments, and who had written him a letter full of complaints. In the mean time he labored to prevent the apprehended deficiency of corn, and in pursuance of this object made an ineffectual attempt to seize the person of Powhatan. In this enterprise he was often surrounded by great perils, and once was nearly poisoned. For some time after his return the colony continued to be filled with internal dissensions and fear of the Indians, but the influence and energy of the president restored quiet and security. His administration, however, had given no satisfaction to the company in England, who were disappointed in not finding their golden dreams realized, and irritated by the undefer-

ential manner of Smith, who had the sense to see the impracticability of their plans, and the frankness to tell them his opinion of them. A new charter was granted, by which the powers heretofore reserved to the king were transferred to the company. Lord De La Ware was made governor, and a fleet of 9 vessels containing more than 500 emigrants set sail, having on board 3 commissioners, Newport, Sir Thomas Gates, and Sir George Somers, who were authorized to supersede the existing administration of the colony, and manage its affairs until the arrival of the governor. The vessel with the 3 commissioners was wrecked, and 7 ships only reached Virginia. Although there was no legal authority to supersede the president, Smith at first made no attempt to maintain his power over the new emigrants, who were mostly "dissolute gallants, packed off to escape worse destinies at home, broken tradesmen, gentlemen impoverished in spirit and fortune; rakes and libertines, men more fitted to corrupt than to found a commonwealth." Disorder and disaster so quickly ensued that Smith, at the request of the better portion of the colonists, resumed his abandoned functions. Refractory persons he threw into prison, and new settlements were planned and established. Returning from a visit to one of them, he was injured severely by the explosion of a bag of gunpowder; and feeling the need of the best surgical skill, and tired of struggling with malicious and violent enemies, he returned to England in the autumn of 1609. In March, 1614, he set sail from London with two ships for the purpose of trade and discovery in New England. He returned in August, and presented a map of the country between the Penobscot and Cape Cod to Prince Charles. In March, 1615, he sailed again for the same coast with the intention of effecting a permanent settlement. The voyage was a succession of disasters. He was chased several times by pirates, and near Flores was taken by a French man-of-war, which kept him prisoner, allowing the crew to return to Plymouth with the vessel. At Rochelle, to which place they carried him, he escaped from the ship, and returned to England shortly afterward. While on board the man-of-war, which was really a pirate, he wrote an account of his voyages to New England, which was published in 1616; and he spent the summer of that year in the west of England, distributing copies of the work. For his services the Plymouth company created him admiral of New England. The remainder of his life Capt. Smith passed in his native land, and but few incidents connected with his personal history during the time are known. In a statement to his majesty's commissioners for the reformation of Virginia, probably written about 1624, he says that he has spent 5 years and more than £500 in the service of Virginia and New England; yet, he continues, "in neither of those two countries have I one foot of land, nor the very house I builded, nor the ground I

digged with my own hands, nor ever any content or satisfaction at all, and though I see ordinarily those two countries shared before me by them that neither have them nor know them but by my descriptions." He published several works, the two most important of which are "The general Historie of Virginia, New England, and the Summer Isles" (1626), and "The true Travels, Adventures, and Observations of Captaine John Smith, in Europe, Asia, Affrica, and America, from 1593 to 1629" (1630). These two works were reprinted at Richmond in 1819 (2 vols. 8vo.). In 1631 he published also a work entitled "Advertisements for the Unexperienced Planters of New England, or anywhere, or the Path-way to Experience to erect a Plantation."—To no one more than to Capt. Smith is the settlement of the North American coast justly due. Without him the Virginia colony would have miserably perished. By the Indians he was looked upon with reverence; and although he sometimes treated them with severity, they never brought any complaints against his justice. He was the first to recommend the settlement of New England, and in his efforts to advance the colonization of America he spared neither time nor labor. His faults were those of an enthusiastic, determined, and uncompromising spirit, and by these he made enemies who were enabled oftentimes to prevent him from receiving his just reward.

SMITH, JOHN PYE, D.D., LL.D., an English clergyman, born in Sheffield, May 25, 1774, died at Guildford, Surrey, Feb. 5, 1851. In his 22d year he entered the Independent academy at Rotherham, and was chosen in 1800 classical tutor in the Homerton theological academy. He subsequently, while retaining his tutorship, became pastor of a newly constituted church at Homerton; and in 1813 he was appointed divinity tutor. From 1843 to 1850 he was again classical tutor; but on the consolidation of Homerton, Highbury, and Coward academies into New college, he resigned, and his friends raised an annuity for him, the capital to found after his death a Smith scholarship in New college. Dr. Smith received the degree of D.D. from Yale college in 1807, and that of LL.D. from Marischal college, Aberdeen, in 1835. He was also a fellow of the royal society and of the geological society. His attainments in physical science were very extensive. His principal published works are: "The Scripture Testimony to the Messiah" (2 vols., 1818-'21; 4th ed. greatly enlarged, 1847); "The Adoration of our Lord Jesus Christ vindicated from the charge of Idolatry" (1811); "Four Discourses on the Sacrifice and Priesthood of Jesus Christ" (3d ed., 1827); "On the Personality and Divinity of the Holy Spirit" (1831); "The Mosaic Account of the Creation and the Deluge illustrated by the Discoveries of Modern Science" (1837); "On the Relation between the Holy Scriptures and some parts of Geological Science" (5th ed., 1854).

SMITH, JOSEPH. See MORMONS.

SMITH, SAMUEL FRANCIS, D.D., an American clergyman, born in Boston, Oct. 21, 1808. He was graduated at Harvard college in 1829, studied theology for 3 years at Andover, and for the next 18 months was editor of the "Baptist Missionary Magazine" in Boston. During his collegiate and theological course he was a large contributor to the "Encyclopædia Americana." In 1834 he was ordained pastor of the first Baptist church, Waterville, Me., and at the same time elected professor of modern languages in Waterville college, both which posts he filled till 1842, when he removed to Newton, Mass., and became pastor of the first Baptist church, and editor of the "Christian Review." He continued his charge of the latter till 1849, when it was removed to New York, and remained in the pastorate at Newton till the summer of 1854, when he resigned, and has since been engaged in literary pursuits and editing the publications of the American Baptist missionary union. From his early youth Dr. Smith has contributed largely, both in prose and verse, to periodical literature; and the well known hymn, "My country! 'tis of thee," is one of his earlier productions. In 1843, in connection with the Rev. Baron Stow, he compiled the "Psalmist," a collection of psalms and hymns more widely circulated than any other in the United States. His other publications are: "Lyric Gems," poems original and selected (Boston, 1844), and "Life of the Rev. Joseph Grafton" (Boston, 1845). He also contributed a large portion of the songs in the "Juvenile Lyre," edited by Lowell Mason.

SMITH, SAMUEL STANHOPE, D.D., LL.D., an American clergyman, born at Pequea, Penn., March 16, 1750, died at Princeton, N. J., Aug. 21, 1819. He was graduated at Princeton college in 1767, and from 1770 to 1773 filled the office of tutor there. He was then licensed to preach by the presbytery of New Castle, and spent some time as a missionary in the western counties of Virginia. For the purpose of securing his educational services here, a seminary was established of which he was made principal, and which afterward became the Hampden Sidney college. In 1779 he was appointed professor of moral philosophy in the college of New Jersey. In 1785 he delivered an anniversary address, which was subsequently expanded into a work on the "Causes of the Variety in the Figure and Complexion of the Human Species" (8vo., 1787). In 1786 he was associated with several other clergymen of the Presbyterian church in preparing the form of presbyterial government which continues to the present time. On the death of Dr. Witherspoon, Dr. Smith's father-in-law, in 1794, the latter succeeded him as president of the college. He resigned that office in 1812 in consequence of repeated strokes of palsy, and for several years occupied himself in preparing his works for the press. Beside two orations and 8 miscellaneous sermons in pamphlet form, and the

work above mentioned, he published "Sermons" (8vo., 1799); "Lectures on the Evidences of the Christian Religion" (12mo., 1809); and "A Comprehensive View of the leading and most important Principles of Natural and Revealed Religion" (8vo., 1816). His "Sermons," with a memoir of his life and writings, were published in 1821 (2 vols. 8vo.).

SMITH, SARA, an American author, born in Buckfield, Me., Sept. 14, 1792. He was graduated at Bowdoin college in 1818, and subsequently settled in Portland as a writer for the periodical press. While there he wrote the well known series of humorous political letters under the pseudonyme of "Major Jack Downing," first published collectively in 1833, and which within a few years passed through several editions. In 1842 he removed to New York, in which city or its neighborhood he has since resided. His remaining publications comprise "Powhatan," a metrical romance (1841), "New Elements of Geometry" (1850), and "Way Down East, or Portraits of Yankee Life" (1855). He has also written many minor occasional poems.—ELIZABETH OAKES (PRINCE), an American authoress, wife of the preceding, born near Portland, Me. She was married to Mr. Smith at the age of 16, and about the same time became an anonymous contributor of poems to the periodical press. In consequence of pecuniary misfortunes in which her husband became involved, she was subsequently induced to make literature a profession; and since her removal with him to New York in 1842 she has frequently appeared before the public as authoress or lecturer. In 1843 appeared the first considerable collection of her poetical pieces under the title of "The Sinless Child and other Poems," and her metrical contributions to the magazines have since been numerous. She is the author of "The Roman Tribute" and "Jacob Leisler," tragedies; "The Western Captive" and "Bertha and Lily," novels; "The Salamander, a Legend for Christmas;" and a number of children's books and miscellaneous publications. In 1851 she published "Woman and her Needs," a work devoted to the rights of woman, which Mrs. Smith has at various times advocated by her pen and as a public lecturer.

SMITH, SYDNEY, an English divine and author, born in Woodford, Essex, June 3, 1771, died in London, Feb. 22, 1845. He was the 2d of 4 brothers, sons of Robert Smith, an English gentleman of eccentric habits, whose wife was the daughter of a French emigrant, and received his early education at the collegiate school of Winchester on William of Wykeham's foundation. He rose to be captain of the school, and was elected to a scholarship in New college, Oxford, where in 1792 he took his degree of B.A. He also obtained a fellowship of £100 a year, which raised him from straitened circumstances into comparative affluence. His own aspirations would have led him to adopt the law as a profession, but in obedience to the

wishes of his father he took orders, and in 1794 was installed as curate in the parish of Netheravon, in the centre of Salisbury plain. Having attracted the notice of Mr. Beach, a wealthy proprietor of the neighborhood, he was appointed tutor of that gentleman's eldest son, and in 1797 accompanied his pupil to Edinburgh, the disturbed state of the continent preventing them from visiting one of the German universities, as was at first intended. The Scottish metropolis was then full of literary celebrities, and during a residence there of several years Smith made many valuable and enduring friendships, beside acquiring some reputation as a preacher and a humorist. In 1799 he was married to Miss Pybus, an English lady, and in 1802, in conjunction with Murray, afterward lord advocate of Scotland, Jeffrey, Brougham, Francis Horner, and others, established the "Edinburgh Review," to the first number of which, in his capacity of editor, he contributed 7 articles. Soon afterward he repaired to London, and as preacher at the founding hospital and several private chapels eked out a support for his increasing family. His sermons attracted large and fashionable congregations, and he delivered during 3 successive seasons (1804-'6) courses of lectures on moral philosophy before the royal institution, which met with great success, but which in after life, with a whimsical allusion to his ignorance of the subject, he characterized as a species of "literary imposture." A posthumous volume, entitled "Elementary Sketches of Moral Philosophy" (1850), contains the substance of these. He was at the same time a constant contributor to the "Edinburgh Review," and his wit and brilliant conversational powers made him a welcome guest at Holland house and other influential mansions. Upon the return of the whigs to power in 1806, he was presented, mainly through the efforts of Lord and Lady Holland, to the living of Foston-le-Clay in Yorkshire, situated in a purely rural district, and worth about £500 per annum. He passed the first year or two of his incumbency in London, discharging his parish duties by means of a curate. In 1807 appeared anonymously "Letters on the Subject of the Catholics," by Peter Plymley, which had an immense circulation at the time, and are among the most characteristic of his writings, sound sense and argument being conveyed in a vein of mingled irony and pleasantry rarely witnessed in a political pamphlet. His efforts in the cause of Catholic emancipation, thus early commenced, were never relaxed until that measure was accomplished. In 1809 he published 2 volumes of sermons, and in the summer of that year removed with his family to Heslington, a village near York, where he was permitted by his diocesan to reside for a few years, in the hope of being able to exchange Foston-le-Clay for some more desirable parish. Being unable to succeed in this, he turned his thoughts resolutely towards Foston, the forlorn condition of

which he characteristically described by saying it was "actually twelve miles from a lemon;" constructed a parsonage which for ugliness and substantial comfort had not its equal in the county; and in the spring of 1814 moved with his whole family into his new quarters. For 14 years he continued to reside at Foston, overcoming the tedium of his rural exile by a never ceasing flow of animal spirits, by various literary avocations, and by preaching, doctoring, lecturing, and ministering to his parishioners with a zeal which won him the affections of all of them. In allusion to the long period that had elapsed since a resident incumbent had preached in the parish, he said: "When I began to thump the cushion of my pulpit, on first coming to Foston, as is my wont when I preach, the accumulated dust of 150 years made such a cloud, that for some minutes I lost sight of my congregation." Visits from Romilly, Mackintosh, Jeffrey, and others also cheered his solitude; and it may be doubted whether any rural incumbent lived more rationally, happily, or usefully than Sydney Smith. In 1828 Lord Lyndhurst appointed him canon of Bristol and rector of Combe-Florey, near Taunton, and 3 years later he received a prebendal stall in St. Paul's, which was the last preferment he was destined to receive. The remainder of his life was devoted to the diligent discharge of his official duties, and to a considerable extent to literary labors; but he wrote nothing for the "Edinburgh Review" subsequent to 1827, thinking it more decorous for a church dignitary to append his name to his writings. In pamphlets and letters to the newspapers he continued to advocate liberal interests and the rights of his order. Having come into the possession of a considerable estate by the death of his brother Courtenay in 1848, he invested largely in the public stock of Pennsylvania; and the neglect of that state to pay the interest on her bonds called out his well known "Petition to Congress" and "Letters on American Debts," which convey in language surcharged with humorous invective his opinions on the subject of repudiation. On other occasions he had stood manfully forward as the eulogist and champion of America, the social life of which he once pronounced "a magnificent spectacle of human happiness." His humor never left him, and under the last regimen of his physician he expressed his longing for "even the wing of a roasted butterfly." A collection of his writings, comprising his review articles, "Peter Plymley's Letters," and various pamphlets and miscellanies, was published in 1839. He left also in manuscript an account of English misrule in Ireland, which his widow was advised by Macanlay not to publish. In 1855 appeared a memoir of him by his daughter Saba, the wife of Sir Henry Holland.

SMITH, THOMAS SOUTHWOOD, M.D., an English physician and author, born about 1790, died in Florence, Italy, Dec. 10, 1861. He studied medicine at the university of Edinburgh, set-

tled as a physician in one of the western counties of England, and while there published a work on "The Divine Government," which attracted some attention. In 1820 he removed to London, and was one of the founders of the "Westminster Review," to which he contributed a series of articles on the necessity of a legalized supply of bodies for anatomical purposes. These he afterward republished in book form, under the title of "The Use of the Dead to the Living;" and this work, with some incidents which occurred about the same time, led to the passage of the anatomy act by parliament, which put an end to the illicit trade. In 1825 he was appointed physician to the London fever hospital, and somewhat earlier to the eastern dispensary. His "Treatise on Fever" (1830) is a standard work with the profession. In 1834 he published "The Philosophy of Health," a treatise which has had a wide circulation. In 1832 he was appointed one of the commissioners to inquire into the condition of factory children, and his report led to the passage of the factory act, which put an end to the inhumanities which had been practised on children in factories up to that period. In 1838 he presented to the poor law commissioners the first of a series of reports on the "Physical Causes of Sickness and Mortality, which are capable of Removal by Sanitary Regulations." This led to the appointment of a sanitary committee by the house of commons in 1840, and of the health of towns commission in 1842. Dr. Smith was appointed in 1840 a commissioner to inquire into the condition of children and young persons in the mines and factories not reached by the factory act, and his reports induced the exclusion of young children and women from mining labor. In 1846, as one of the metropolitan sanitary commissioners, he made a report on the means requisite for the improvement of the health of the metropolis, of which the result was the public health act of 1848 and the establishment of a general board of health. On its abolition he received a pension of £300.

SMITH, WILLIAM, LL.D., the "father of English geology," born at Churchill, Oxfordshire, March 23, 1769, died in Northampton, Aug. 28, 1839. His occupation in his youth was that of a land surveyor and engineer, and previous to 1791 he had observed the effect of different classes of underlying rocks upon the soil, and had made comparisons of strata in a few localities. In that year, being employed to make surveys of several mines in Somersetshire, his attention was called more strongly than ever before to a certain constancy in the superposition of strata, and to some remarkable instances of coal beds lying unconformably beneath the red marl. In his subsequent explorations for the Somerset coal canal, he made further observations, which confirmed his previous discoveries; and after a time he observed another fact which became subsequently the key of geological dis-

covery, viz., the constancy of certain fossils in certain formations, and their dissimilarity to those of the adjacent strata. Collecting these in the strata he had been able to examine, he arranged them in the order of their natural position, and was thus led to the recognition of the fact that these several layers had each in turn formed the bed of the sea, and had its inhabitants, whose remains now constituted its fossils. Having fully established this idea, he made a long journey through England and Wales, and commenced in 1794 a "Map of the Strata of England and Wales;" and 5 years later he drew up in tabular form the "Order of the Strata and their Organic Remains, in the Vicinity of Bath, examined and proved prior to 1799." In 1801 a small geological map of England was produced, and in 1815 the "Geological Map of England and Wales, with Part of Scotland," accompanied by an interesting treatise. Between 1819 and 1824 he published 21 geological maps of English counties, colored to represent the strata, and some works on organic remains. In 1824 and the 4 subsequent years he lectured on geology at various places. From 1828 to 1834 he resided at Hackness, the estate of Sir J. V. B. Johnstone, where for the first time geological principles were applied to the development of agriculture. His geological map of that estate, executed with great minuteness and exactness, is a model for such productions. In 1831 he received from the geological society the Wollaston medal for his great discoveries in geology; and in 1838 he was appointed by the government a member of the commission for selecting the stone for the new houses of parliament.

SMITH, WILLIAM, LL.D., an English classical and biblical scholar, born in London in 1814. He was educated at University college, London, and studied law, but abandoned the profession for a professorship of the Greek, Latin, and German languages at the Independent collegiate schools of Highbury and Homerton. In 1850, on the consolidation of Coward college with Highbury and Homerton academies, to form New college, London, Dr. Smith was appointed professor of the Greek and Latin languages and literature; and in 1853 he was appointed classical examiner in the university of London. In 1841 he commenced the publication in numbers of the "Dictionary of Greek and Roman Antiquities," of which he was the editor, and many of the articles were from his pen. This was completed in 1842, and followed by the "Dictionary of Greek and Roman Biography and Mythology" (3 vols. 8vo., 1843-'9), the "Dictionary of Greek and Roman Geography" (2 vols. 8vo., 1857), and the "Dictionary of Biblical Biography, History, and Literature" (vol. i., 1859). All these dictionaries (except the last, still unfinished) have been abridged by him for the use of schools. He has also written several school histories, among which are a "History of Greece," and an abridgment

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of the same; an edition of Gibbon's "Decline and Fall of the Roman Empire," and a "Student's Gibbon" and "Student's Hume," each in one volume. He has also published a Latin-English dictionary (1855) based on Forcellini and Freund, and is now (1862) engaged in editing a new "Biographia Britannica."

SMITH, SIR WILLIAM SIDNEY, an English admiral, born in Midgham, Sussex, in 1764, died in Paris, May 26, 1840. He entered the navy at the age of 12 as a midshipman, and before he was 20 had attained the rank of post-captain. After the close of the American war he participated, by the permission of the government, in the war between Sweden and Russia as a captain in the Swedish service, and after the surrender of Toulon to Lord Hood he effected the destruction of those French ships of war which could not be removed, and also of a large amount of ammunition and military stores. Soon after, in command of a small flotilla, he harassed French commerce in the channel, but in April, 1796, was captured by a superior force and confined in the prison of the Temple in Paris. The French government refusing to exchange him, he effected his escape by French aid after an imprisonment of two years. In 1798 he was put in command of a squadron destined to operate against the French on the coast of Egypt, and conducted the memorable defence of St. Jean d'Acre, against a numerous army under Napoleon, with a skill and courage which gained him the title of the "hero of Acre." He signed a treaty with Gen. Kléber for the evacuation of Egypt by the French, and after the disavowal of this proceeding by the British government participated in the war, until compelled, chiefly by wounds received at the battle of Alexandria (March, 1801), to return to England. He met with an enthusiastic reception, and upon the renewal of the war was appointed to an active command. His services until the general peace were varied and important, and at the close of the war he received a pension of £1,000 and was made a K.C.B. At the period of his death he held the rank of admiral in the British navy and lieutenant-general of marines, having succeeded William IV. in the latter office. The latter years of his life were, in consequence of pecuniary misfortunes which obliged him to leave England, passed in Paris. He was one of the earliest advocates of abolishing the slave trade. Memoirs of his "Life and Times" were written by I. Barrow (2 vols., London, 1847).

SMITHFIELD, a township of Providence co., R. I., bounded E. and N. E. by the Blackstone river, and traversed along its N. E. border by the Providence and Worcester railroad; pop. in 1860, 13,283. Its centre is about 9 m. N. W. from Providence. Beside the Blackstone river, there are several small streams which drain the township, and some of which furnish valuable mill sites. On the Blackstone there is a remarkable fall called Woonsocket falls, of about 20 feet descent, and having numerous

circular excavations, some of them of considerable size. In the S. part of the township is a pond called Scott's pond a mile long and half a mile wide, of great depth, its banks descending almost precipitously. In the central portion there are extensive quarries of limestone, producing a superior quality of lime, which is largely exported. There are also quarries of soapstone or talcose slate, and of whetstone of good quality. Along the Blackstone river is a succession of manufacturing villages almost joining each other. The most important are Central Falls, Lonsdale, Albion, Manville, Woonsocket, and Slatersville. In 1857 there were in the town 28 cotton and 2 woollen mills, with 3,252 looms and 142,648 spindles, manufacturing annually 26,211,000 yards of cloth, and consuming 4,277,291 lbs. of cotton and 22,800 lbs. of wool; a bleachery, turning out 7,700,000 yards of cloth; a scythe factory, making 7,000 dozen scythes, and consuming 1,200 tons of iron and steel; 5 thread factories, making from 300,000 to 400,000 lbs. of thread annually; a brass foundry, a rotary pump factory, 4 grist mills, and 9 saw mills. The capital employed in manufactures in 1860 was \$3,334,300; value of raw material used during the year, \$2,721,780; annual product, \$6,886,483; total value of taxable property, \$6,540,410. There were 18 churches, and 35 school districts, with an average of 1,743 scholars in summer and 1,902 in winter.

SMITHSON, JAMES, an English physicist, and founder of the Smithsonian institution, died in Genoa, June 27, 1829. He was a natural son of Hugh, third duke of Northumberland, and Mrs. Elizabeth Macie, heiress of the Hungerfords of Audley, and niece of Charles, duke of Somerset. He was educated at Oxford, where in 1786 he took an honorary degree under the name of James Lewis Macie, but soon afterward adopted the name of Smithson, the family name of his father, by which he was always subsequently known. At the university he distinguished himself greatly as a chemist, and was one of the first to adopt the method of minute analysis. His fondness for this and other branches of physical science led him to devote himself exclusively to scientific pursuits, and he became the friend and associate of Wollaston, Banks, Davy, Black, and Thompson. In 1790 he was elected a fellow of the royal society, and almost immediately became a contributor to its "Transactions," 8 papers in which are from his pen, viz.: "On the Concretions frequently found in the Hollow of Bamboo Canes, named Tabasheer;" "A Chemical Analysis of some Calamines;" "Account of a Discovery of Native Minium;" "On the Composition and Crystallization of certain Sulphurets from Huel Boys in Cornwall;" "On the Composition of Zeolite;" "On a Substance procured from the Elm Tree, called Ulmine;" "On a Saline Substance from Mount Vesuvius;" and "Facts relative to the Coloring Matter of Vegetables." His papers subsequent

to 1818 were published in the "Annals of Philosophy," and other scientific periodicals. At his death he left about 200 manuscripts, which seem to have been intended to form portions of a philosophical dictionary. In minute chemical analysis he was equalled only by Dr. Wollaston. He was deeply interested in geological investigations, and in his travels in Great Britain and on the continent he everywhere observed and noted in his journal the evidences of geological structure, the mineral contents of rocks, and the superposition of beds, as well as the methods of mining, of smelting ore, and of conducting manufacturing processes. Three years before his death Mr. Smithson executed his will, in which, upon the occurrence of certain contingencies, he bequeathed "the whole of his property to the United States of America to found at Washington, under the name of the Smithsonian institution, an establishment for the increase and diffusion of knowledge among men." It is said that he purposed at one time to leave this fund to the royal society for the promotion of science, but changed his intention on account of a misunderstanding with the council of the society; but this never affected his relations with the eminent scientific men with whom he had been associated in the society. (See SMITHSONIAN INSTITUTION.)

SMITHSONIAN INSTITUTION, an establishment in Washington, D. C., organized by act of congress in April, 1846, to carry into effect the provisions of the will of James Smithson. The condition on which the bequest was to take effect in favor of the United States having occurred in 1835, by the death of a nephew of the testator without issue, the American government was officially notified of its reversionary interest in the estate. The fact being communicated to congress, a joint committee reported recommending the acceptance of the trust. It was accordingly accepted, and the president authorized to send a commissioner to England to prosecute the claim. The Hon. Richard Rush was selected for this duty, and proceeded to London. Though obliged on technical grounds to resort to a process in chancery, every assistance was afforded him by the British government for a speedy decision, and at the end of 18 months he was able to declare his mission successfully terminated, and on Sept. 1, 1838, deposited in the U. S. mint the proceeds in English sovereigns, which yielded on recoinage \$515,169. It yet remained to be settled in what way the comprehensive and liberal design could be most effectually carried out; and the president addressed a circular to eminent citizens of the country requesting their views as to the mode of disposing of the fund. Among the numerous suggestions made was one by John Quincy Adams which partially formed the basis of subsequent action. He recommended the successive application of the interest of the fund, for a limited but sufficient term of years, first to one great purpose of scientific inquiry, and then to

another. He opposed the employment of the fund, as others had advised, for educational purposes, as wholly inconsistent with any just construction of the terms of the bequest, or with the design of the testator. He indicated as of primary importance for the application of its income, the establishment of a national observatory, which however was provided from national funds before the final action of congress in organizing the proposed institution. Others suggested the establishment of a botanical garden and experimental farm, a normal school or seminary for the education of teachers, and a national library of the most comprehensive character. For several sessions the conflicting plans proposed were discussed in congress, the money having been meantime lent to the U. S. government. At length, in April, 1846, an act in 11 sections was passed organizing the Smithsonian institution. The 1st section creates an "establishment" for the increase and diffusion of knowledge among men, to consist of the president and vice-president of the United States, the several members of the cabinet, the chief justice of the supreme court, the commissioner of the patent office, and the mayor of Washington, during their respective terms of office, with such other persons as these may elect honorary members of the institution. The 2d declares the original fund to be lent in perpetuity to the treasury of the United States at 6 per cent.; appropriates the interest to July 1, 1846, amounting to \$242,129, or so much thereof as might be necessary, for the erection of suitable buildings and other current incidental expenses; and provides that all expenditures and appropriations shall in future be made exclusively from the accruing interest and not from the principal of the fund. By the 3d section a board of managers is constituted, under the name of "Regents of the Smithsonian Institution," to be composed of the vice-president of the United States, the chief justice, the mayor of Washington, 3 members of the senate and 3 of the house of representatives, to be selected by the president and speaker thereof, with 6 other persons not members of congress, of whom 2 shall be resident in the city of Washington and the other 4 inhabitants of the United States, but no 2 of the same state. This board is required to elect one of its members as presiding officer, to be styled the chancellor of the institution, and also a suitable person to act as secretary both of the institution and the board. To this body is assigned the duty of a general superintendence, and of making an annual report to congress on the operations, expenditures, and condition of the institution. By the 4th, 5th, and 6th sections a location is assigned and power given for "the erection of a suitable building of sufficient size, with apartments for the reception and arrangement upon a liberal scale of objects of natural history, including a geological and mineralogical cabinet; also a chemical laboratory, a library, a gallery of art, and

the necessary lecture rooms;" and provision is made that all objects of art, natural history, &c., belonging to the United States, with such as may be collected from whatever source by the institution itself, shall be deposited in the building in such order and so classed as best to facilitate the examination and study of them. The 7th section devolves on the secretary the charge of the building and property, the duties of librarian and keeper of the museum, with the power of employing assistants, subject to the approval and removable at the discretion of the regents. Section 8 defines the visitorial relations of the members of the establishment toward the board of regents, and also limits the expenditure for the library. By the 9th section the managers are authorized to dispose of such portion of the interest of the fund as the act has not otherwise appropriated, in such manner as they shall deem best suited for the promotion of the purpose of the testator. Section 10 provides for the delivery to the librarian of a copy of every publication secured by copyright; a provision since repealed, at the instance of the regents, as producing an accumulation of matter foreign to the objects of the trust. The 11th section gives congress the power of altering, adding to, or repealing any of the provisions of the act.—The entire cost of the building, improvement of the grounds, &c., was about \$325,000; but by spreading over several years the expense of completing the less important details, and by the aid afforded by congress in the care of the grounds, and in eventually relieving the institution of the indiscriminate custody of the national collections of natural history, the board were able to save \$140,000 of the accrued interest to add to the fund, which thus amounted to \$655,000. The burdens imposed on the comparatively small net annual income of less than \$40,000 by the act of organization were very heavy; but by a careful administration of its affairs, and the recognition of their just relations to each other, the objects specified have received a fair share of attention. A library has been collected, which, though smaller than many others, is yet, from its collection of foreign works and the transactions of learned societies, unequalled in this country as a resource for scientific reference; the museum, enriched by the fruits of governmental expeditions and the contributions of individual explorers under the direction of the institution, has attained a magnitude and completeness seldom surpassed in collections for the illustration of natural science; a commencement of a gallery of art has been made; and lectures, chiefly on scientific subjects, have been delivered every season to large audiences from every part of the country. Beside this, availing themselves of the sanction of the 9th section, the regents have inaugurated a system of scientific researches and publications which has proved an efficient instrumentality for the "increase and diffusion of knowledge among men." The board



of regents at an early session after their appointment selected Prof. Joseph Henry, then of Princeton college, N. J., as their secretary, an office which he still holds. His assistants are Prof. Spencer F. Baird, formerly of Dickinson college, Carlisle, Penn., in the natural history department, and William J. Rhees in the library department. The board of regents from its composition has necessarily changed with almost every year, and of its original members only the chancellor, Chief Justice Taney, the Hon. James A. Pearce of the U. S. senate, Prof. A. D. Bache of the U. S. coast survey, and Gen. Totten of the U. S. engineers, remain. Of the 6 non-official members, only President Felton of Cambridge, Mass., has been connected with it for more than the present year. Soon after his appointment, Prof. Henry submitted to the board a "programme of organization" of the proposed operations under the 9th section, which was adopted, and still constitutes the basis of management of that department of the institution. For the increase of knowledge, he suggested that men of talent and erudition should be afforded the means of conducting researches, and stimulated to exertion through the facilities of publication and occasional compensation; and for its diffusion, the publication of such works as, while adding materially to the sum of human knowledge, would not find a remunerative sale in the ordinary channels of trade. He insisted that it ought to be a rule of the institution to do nothing which can be equally well done by any organization or instrumentality already in action. The results attained in this department of the institution are as follows: 1. *Researches*. The claims of different classes of scientific research to the countenance and aid of the institution have always been pressing and difficult of adjudication; yet a preference has been given to those of widest influence and benefit to the race. Ethnology was believed to be one of these, and a valuable and expensive memoir on the archaeology of the Indian tribes was the first to receive assistance. In connection with this, researches in comparative philology were regarded as important, and therefore aid was extended to the compilation of a Dacotah grammar and dictionary, and a grammar of the Yoruba language. The circulation of these has led to other researches in those sciences, some of which are receiving or will receive assistance. Astronomy has also engaged the earnest and continued efforts of the institution for its promotion theoretically and practically. For this purpose it afforded important aid in the determination of the true orbit and perturbations of Neptune, and published an ephemeris of that planet, which was accepted by astronomers as the only certain guide to its position; and has furnished pecuniary assistance to expeditions undertaken with the view in a greater or less degree to astronomical observations, as those of Drs. Kane and Hayes, of Lieut. Gilliss to Chili in 1858, and of Prof. Alexander,

under the direction of Prof. Bache of the U. S. coast survey, to Labrador in 1860. It has not only furnished instruments for physical observation to all these expeditions, but in most cases has defrayed the expense of the reduction and publication of the results. In meteorology and terrestrial magnetism it has more than 500 regular observers scattered over every part of the continent, and is rapidly accumulating data through this and other measures steadily and systematically pursued for developing the fixed laws which govern the apparently inconstant phenomena of nature. The natural history, geography, climatology, geology, mineralogy, botany, and archaeology of this continent have through its aid received a greater impulse, and more material has been collected for increasing and diffusing the knowledge of them among mankind, than through all other instrumentalities during the national existence. 2. *Publications*. These are of 3 classes. 1st. "The Smithsonian Contributions to Knowledge," comprised up to the present time (1862) in 13 4to. volumes of large size, and in many cases expensively illustrated. It is one of the rules of the institution that no memoir shall be admitted into this series which rests on unverified hypothesis, or which does not offer some positive addition to the sum of existing knowledge; and the pretensions of each in this respect are decided by previous submission to the judgment of two or more arbiters of unquestionable competence and impartiality. The volumes thus far issued form a series for the publication of which no learned society in this country possessed the means, and which have only been equalled by foreign societies when aided by their governments. They have been distributed gratuitously among all the important libraries and learned associations of the world, and have afforded the means of obtaining by literary exchange those invaluable sets of the "Transactions" of foreign learned societies, not otherwise to be found in this country. 2d. The "Annual Reports" to the regents, which, beside a popular analysis of the memoirs to be contained in the several forthcoming volumes of the "Contributions," are accompanied by a synopsis of lectures and original or translated articles which introduce the student to information and topics of discussion much above the range of those usually presented even to the educated public. These are printed at the expense of congress, and are circulated through the members of both houses, as well as by the institution itself. 3d. The "Smithsonian Miscellaneous Collections," an occasional series comprising meteorological and physical tables, treatises on subjects of practical or scientific interest, and manuals for the collection and preservation of objects of natural history, as well as methods for various physical observations. 3. *Exchanges*. The institution now acts as the principal, and is gradually becoming the exclusive, means of communication between the literary and scientific

associations of the old and the new world. Our own and other governments in which these exchanges are made exempt the material which it transmits from duty, and most of the railroad and steamboat lines transport it free from cost. This, though it imposes a vast amount of labor upon the employees of the institution, is productive of so many and such evident benefits to all who send or receive the documents thus transmitted, that it will be maintained. 4. *Scientific Correspondence.* The correspondence of the Smithsonian institution with all quarters of the globe is vast and constantly increasing. Almost every day brings narratives of real or supposed discoveries which are referred to the institution, inquiries on scientific topics of all kinds, or unusual phenomena, &c. These letters are all answered either by the officers of the institution or by some of their collaborators to whose special department of study the inquiries may pertain. —The museum and library have both been organized as harmonious parts of the same general system, being mainly confined to such objects and publications as are best adapted to promote the special aims of the institution.

SMOKE, the cloud of light carbonaceous particles which rises from fires in which the combustion is incomplete, owing to the escape of the elements of the fuel before they are exposed to the high temperature and access of air required for their thorough combustion. (See CHIMNEY, COMBUSTION, FLAME, and FUEL.) Smoke escapes most freely from those carbonaceous bodies which burn with great rapidity, as the hydrocarbons and the bituminous coals, and appears to result from the decomposition of the vapors or gases that are sent forth from these, a portion of the carbon thus set free, not meeting at once its atoms of oxygen and escaping further action of the fire and air, passing off in sooty flakes. This principle of combustion is explained in the article GAS, vol. viii. p. 102. Those fuels which consist chiefly of fixed carbon, as anthracite and the coke of bituminous coal, evolve no smoke, for the first movement of the carbon into the air is when it combines with oxygen to form the invisible carbonic acid or carbonic oxide from which it is not again set free. In most processes of combustion, whether the object be the production of heat or light, the formation of smoke should be guarded against as involving both a nuisance and a loss of fuel. Thus the argand burner and the glass chimneys of lamps are designed, by producing a proper draught of air and its intermixture with the products of combustion, to render this complete, and cause all the carbonaceous particles to combine with oxygen, in which condition they disappear in a gaseous form. Otherwise, after being carried up with the heated column, the sooty matters are floated about in the atmosphere, and finally settle down upon whatever substances they come in contact with. In large cities where bituminous coal is the common fuel, and consumed upon a

great scale for steam engines and manufacturing purposes, clouds of smoke fill the atmosphere and penetrate the houses, diffusing everywhere the unpleasant bituminous odor, lessening the quantity and duration of the light of day, and depositing flakes of soot upon the furniture, pictures, books, and clothing of the inmates. In Pittsburg the evil has become so great, that white articles of external dress are almost discarded in consequence of their becoming immediately soiled. In England the nuisance was considered so great in the time of Queen Elizabeth, when the dyers, brewers, smiths, &c., were but just beginning to use "pit coal," that attempts were made to prohibit its consumption in London by legislative action. (See COAL.) Since that time the magnitude of the nuisance has increased enormously, and numerous attempts have been made to mitigate it by improving the methods of combustion, and compelling manufacturers to adopt these or the use of smokeless fuels. Thus coke has been brought into very extensive use in the cities and upon the railroads of Great Britain in the place of raw bituminous coal, and various ingenious plans have been devised for conducting the combustion of raw coal without the production of smoke. Some of these plans are both efficient and economical by the saving of fuel they effect, but their adoption has been greatly opposed by manufacturers, on account of involving modifications of their apparatus already in use, and being dependent to some extent upon more judicious care of the workmen who have charge of feeding the fires. The attempts at improvement have been directed to one of two objects, either to prevent the production of smoke by effecting complete combustion in the furnace, or to consume the smoke after it is evolved from one fire by passing it through another supported by a smokeless fuel. It is observed that the great mass of smoke is sent forth from fuel freshly thrown on the fire, and that it diminishes as the fire becomes hot. This is not altogether owing to the elements of the smoke being gradually exhausted, but rather to the sudden evolution of great quantities of gaseous matter from the large amount of surface of fresh fuel, and the mechanical sweeping off of the carbon liberated from this before it could be fairly exposed to the further action of the heat and air. This suggests that the fuel should be added gradually, and that it should be spread over the front portion of the grates, so that the smoke shall have to pass over the fire behind and thus be consumed as it mixes with the excess of air carried along with it. Several of the methods of preventing the smoke nuisance are based on this principle, and mechanical arrangements have been contrived for introducing the fuel into the large fires for steam engines and manufacturing operations in a continuous and uniform manner. The admission of sufficient air is of course effectually provided for, and in some of the arrangements this is first heated and distributed by numerous

jets so as to be thoroughly intermixed with the products of combustion in the fire chamber. James Watt, who directed his attention to this subject, and took out a patent in 1785 for consuming smoke and increasing the heat of furnace fires, passed the products of combustion through very hot pipes, "or among, through, or near to fuel which is intensely hot, and which has ceased to smoke, mixing it with fresh air when in these circumstances." The use of the hot pipes, or of any extra heat beside that afforded by the burning of the fuel itself, is considered by Charles Wye Williams, in his "Prize Essay on the Prevention of the Smoke Nuisance" (London, 2d ed., 1857), as altogether needless, the admission of air being, under proper arrangements, all that is required. His method is to admit an abundant supply of cold air through the door and front plate of the fire, which are perforated with great numbers of small holes by means of which the air is uniformly diffused throughout the fire chamber. The bridge is also made hollow and furnished on the back side with a similar perforated plate, through which the air passing either from the side or from the front under the grate is diffused beneath the boilers and thoroughly intermixed with the products of combustion that pass over the bridge. A chamber behind the bridge affords room for this intermixture to take place. With this arrangement particular care is also directed to keeping a proper proportion in the areas of the flues to the grate surface and the amount of coal consumed, that the gaseous matters should have abundant room and find unobstructed passage through the chimney. In carefully regulated trials great economy has been attained by this plan, but in practice a similar saving has not generally been observed, probably from the difficulty of exactly regulating the supply of air and securing the proper dimensions of the flues. As regards the prime object of preventing smoke, the plan is however perfectly successful. It has been improved by the arrangements for heating the air before it is admitted; and in the most effective coal-burning locomotives it has been found highly advantageous to place fire bricks in different positions for the gases to play upon them, and thus ignite through the heat which these absorb and readily impart again. Beside these, deflectors have also been introduced, the object of which is to turn the gaseous mixture down upon a separate grate, on which a slow coal fire is burned with a very contracted admission of air. But even without this fire they serve to produce a more perfect mixture of the gases, and the fire bricks retain heat for effecting the combination of these.—Among other plans for preventing smoke is that of Ivison, which consists in the introduction of steam by minute jets from a fan-shaped distributor in the fore part of the furnace. The fire by this arrangement is greatly increased in intensity without the production of smoke, and with a saving of fuel in experimental trials of

83 per cent. From this saving, however, is to be deducted the loss of  $\frac{1}{10}$  the steam generated which is appropriated to this purpose, unless the escape steam, in the case of high pressure engines, be used for injection.—Another plan consists in the gradual and regular introduction of the coal, so that it has time to become coked before it is exposed to the full heat of the fire. The volatile products of the coking process pass forward over the incandescent coke that has preceded, and are there thoroughly consumed. Jucke's arrangement is the most approved, but is still complicated and liable to get out of order. The grate bars are replaced by an endless chain web, which is carried round upon two rollers, one upon each end of a carriage that can be run in and out whenever necessary. The back roller when in place is under the bridge, and the front one under an inclined platform which reaches from the charging door down to the fire room. As the rollers slowly turn they carry the endless chain along to the bridge, under which it passes. In front it continually receives its load of coke that slips down the inclined plane, and on the passage to the bridge this is quite consumed. This system of feeding by mechanical power has been much used in England, and though expensive, and somewhat troublesome at times, has been very generally approved, for the uniform manner in which it may be made to distribute the fuel. Other inventions are based on supplying fuel to the fires from beneath, so that the products of combustion must pass through the incandescent coals above before escaping.—The principal works to which reference may be made for further information upon this subject are the treatises of Charles Wye Williams, one named above, and the other "On the Combustion of Coal and the Prevention of Smoke" (London, 1841); "Rudimentary Treatise on Fuel," by T. Syme Pridcaux (1853); Fairbairn's "Useful Information for Engineers" (1857); "The Permanent Way and Coal-Burning Locomotive Boilers of European Railways," by Zerah Colburn and A. L. Holley (New York, 1858).—For the prevention of smoke in dwelling houses, see WARMING AND VENTILATION.

SMOLENSK, a W. government of Russia, bounded N. by Tver, E. and S. E. by Moscow and Kalooga, S. by Orel and Tchernigov, and W. by Mohilev, Vitebsk, and Pskov; area, 21,653 sq. m.; pop. in 1858, 1,102,076. The surface is an elevated undulating plain, broken occasionally by low hills. The chief rivers are the Dnieper and Desna. It is interspersed with numerous small lakes and morasses; and there are immense forests of excellent timber, which abound with wild fowl and large and small game. The soil is generally productive. The government has rare facilities for grazing, and great numbers of cattle and of the celebrated Lithuanian horses are raised. Much attention is given to raising bees, and honey and wax form important articles of export. Iron, copper, and salt are found. Linen and woollen

goods are manufactured to some extent, and carpets of a superior quality are exported.—SMOLENSK, the capital, is situated on both sides of the Dnieper, 250 m. W. S. W. from Moscow; pop. about 13,000. The river is crossed by a wooden bridge. The town is well fortified, and that portion of it on the right bank is surrounded by a high and strong wall. It is the seat of a bishop, and has 16 Greek churches and numerous other public buildings. Its manufactures consist chiefly of linen and woollen cloths, leather, hats, and soap. It was an important town in the 9th century, and was long independent under its own princes. The Tartars, Lithuanians, and Russians afterward held it successively; and in the 16th and 17th centuries it was the scene of many conflicts between the Poles and Russians, often changing masters, but finally taken by the latter in 1654. On Aug. 16 and 17, 1812, was fought the memorable battle of Smolensk, between the French army consisting of 180,000 men with 500 field pieces under Napoleon, and the Russian army of 140,000 men under Raefski, Barclay de Tolly, and Bagration. On the 16th the French appeared in front of Smolensk and commenced the attack, but were repulsed. In the mean time the main body of the Russian army marched into the city, and preparations were made for a vigorous resistance. The next day the French made a furious assault upon the town, but failing to capture it, the assaulting columns fell back upon the main army and prepared for a more general and vigorous attack upon the following day. In the night the Russians abandoned the town, and it was occupied by the French next morning, and a large portion of it burned. The Russian loss was 10,000 men, and the French 15,000.

SMOLLETT, THOMAS GEORGE, a British author, born in Dalquhurn house, parish of Cardross, Dumbartonshire, in 1721, died at Monte Nero, a village near Leghorn, Oct. 21, 1771. By the death of his father, who was a younger son, he was left dependent upon his grandfather, Sir James Smollett of Bonhill, who had been a member of the Scottish parliament. He was educated at the grammar school of Dumbarton and at the university of Glasgow, chose the medical profession, and was apprenticed to Mr. Gordon, an eminent practitioner of Glasgow, but devoted himself less to medical studies than to the pursuits of literature, miscellaneous reading, practical jokes, and the composition of satirical verses. He was in his 18th year when his grandfather died, leaving no provision for him. The term of his apprenticeship expired in his 19th year, and he set out for London, carrying with him a tragedy entitled "The Regicide," and eager for distinction as a dramatic writer. He made vain efforts to get the play produced on the stage, which he recounted in an amusing and indignant preface, when in 1749 he decided to "print it and shame the rogues." Thwarted in his purpose, he accepted in 1741 a position as surgeon's mate on

board an 80-gun ship, and sailed on the disastrous expedition against Carthage, which he has described in "Roderick Random," and with more detail in the "Compendium of Voyages." He left the navy in disgust at Jamaica, and while residing there became acquainted with Anne Lascelles, a young West Indian lady, whom he married in 1747. Returning to England in 1746, after the battle of Culloden, he produced anonymously "The Tears of Scotland," an ode in which he laments the atrocities committed by the royal army upon the insurgent families. He also published "Advice, a Satire" (1746), and "Reproof, a Satire" (1747), and wrote "Alceste, an Opera," for the Covent Garden theatre, which was withdrawn in consequence of a quarrel with the manager, and was never printed. His satires, in which he vented his numerous personal spites, alarmed his friends and increased the hostility of his enemies. In 1748 appeared the first of his novels, "The Adventures of Roderick Random," the hero of which is a young Scotsman, who in quest of fortune is led through different countries, whose national characteristics are described, and into the most diverse social connections with men of all ranks, wits, sharpers, courtiers, and courtesans. Rapidity and variety of incident, ease of style, and an exhaustless humor and knowledge of life are the prominent excellencies of the novel, which however lacks the elaboration and unity of design that mark the works of Fielding. He made a short visit to Paris in 1750, and in 1751 published "The Adventures of Peregrine Pickle," abounding in eccentric characters and mischievous galantries, and disfigured by an episode detailing the intrigues of Lady Vane, for inserting which he is said to have received a liberal reward from her. He now resumed the medical profession, established himself at Bath, and published in 1752 "An Essay on the External Use of Water." Obtaining no practice, he removed to Chelsea, and devoted himself again to literary pursuits. In 1753 appeared his "Adventures of Ferdinand and Count Fathom," the hero of which was designed to be a complete villain, "a beacon for the benefit of the inexperienced and unwary." The adventures are sometimes repulsive, but illustrate the satirical genius of the author. A person named Gordon, whom Smollett had supported for several years, now provoked him by an insulting letter to inflict personal chastisement on him. An action for damages ensued, and the author's hasty temper involved him also in a dispute with the counsel for the plaintiff, the literary fruit of which was an indignant and sarcastic letter afterward published in the "European Magazine." He executed amid pecuniary embarrassment, and published by subscription in 1755, his translation of "Don Quixote," more animated and elegant but less accurate than that of Jarvis, on which it was founded. He was least successful in rendering the proverbial humor of Sancho. On a visit to his native country he met with a flat-

tering reception, and after returning to London undertook the management of the "Critical Review." His irritable temper and capricious tastes involved him in numerous vexations and quarrels; a contemptuous critique on the "Rosciad" provoked against him the spleen of Churchill; and in 1759 an attack on Admiral Knowles, one of the commanders at Carthage, caused him to be arraigned for libel and sentenced to pay a fine of £100 and to suffer 3 months' imprisonment. He had meantime produced a "Compendium of Authentic and Entertaining Voyages" (7 vols., 1757), a comedy entitled "The Reprisals," which Garrick brought out on the stage, and a "Complete History of England" (4 vols., 1758), written in 14 months, which became very popular, an edition of 10,000 copies being rapidly sold. While in prison he wrote "The Adventures of Sir Launcelot Greaves," which appeared in the "British Magazine" in 1760-'61, a sort of travesty of "Don Quixote," and the least esteemed of his novels. He afterward contributed the accounts of France, Italy, and Germany to the "Modern Universal History," and continued his "Complete History of England," bringing the narrative down from 1748 to 1764. On the accession of George III. he undertook to defend the administration of Lord Bute in a weekly paper entitled "The Briton." He was effectively and abusively answered by Wilkes in his "North Briton," and his services being unpaid, and his side most unpopular, he withdrew from the contest. His health was shattered by this discomfiture, by his labors on a translation of the works of Voltaire and on a compilation entitled "The Present State of All Nations," and by the death of his only child; and in 1763 he went abroad for two years to dissipate his grief. He published the result of his observations in "Travels through France and Italy" (1766), some of the judgments in which are mere ebullitions of ill temper. It was ridiculed by Sterne in his "Sentimental Journey." On returning from Italy he visited Scotland, resided at Bath during the following year, and there wrote "The Adventures of an Atom," a political satire, witty and indelicate, in which he assailed Lord Bute and the earl of Chatham. His broken health obliged him again to seek a milder climate, and he proceeded to Italy in 1770, beginning on his way to write "The Expedition of Humphrey Clinker," which appeared in 1771, just before his death. It is the most highly esteemed of his novels, contains Lismahago, his best drawn character, and abounds in grave and humorous observations. "He was often wrong," says Masson, "and always irascible, continually fancying himself aggrieved, and always with a quarrel on his hands; but he was as proud, warm-hearted, and mettlesome a Scot as had then crossed the Tweed; of a spirit so independent that he never asked a favor for himself from any great man in his life; paying his way honestly, and helping liberally those about him

who were in distress." As a novelist he holds rank with Fielding and Richardson, and he presents peculiar graces also as a poet, historian, and critic.

SMYRNA (Turk. *İsmir*), a town of Asiatic Turkey, in the pashalic of Anatolia, situated near the head of the gulf of the same name, on the W. coast of Asia Minor, in lat. 38° 26' N., long. 27° 10' E., 210 m. S. S. W. from Constantinople; pop. estimated at 150,000. The surrounding country is remarkably picturesque and beautiful, and the domes, minarets, and cypress trees give the town a fine appearance from the sea. It stands upon a plain between the ancient Mons Pagus and the sea, part of it being on the slope of the hill. The streets are badly laid out, narrow, and dirty. The town is divided into separate quarters, each inhabited by a distinct race. The Franks and Greeks occupy the portion along the shore; the Armenian quarter is situated partly on the level ground and partly on the lower slopes of the hill; the Jews are confined to two small spaces between the Armenian and the Turkish districts, which latter extends along the upper slopes of the hill. In the Frank quarter the houses are mostly built of stone, and there are many good shops, coffee houses, and warehouses; but in other parts they are nearly all constructed of wood and have a very miserable appearance. The Turks number about 80,000, the Greeks 40,000, the Jews 15,000, the Armenians 10,000, and the Franks 5,000. There are numerous bazaars well stocked with different sorts of goods, but they are intricate, dark, and dirty. The governor's residence has been constructed out of the ruins of an old theatre. There are new barracks capable of accommodating 3,000 men; several mosques, into all of which Christian visitors are admitted; Greek, Armenian, Roman Catholic, and Protestant churches, synagogues, and a convent. There is also an English hospital, and a cemetery. An extensive castle occupies the summit of the hill, but the walls are not in a good state of repair, and it is unoccupied. The climate is very hot and unhealthy, the plague sometimes committing great ravages.—The trade of Smyrna both by sea and land is very considerable, the latter being carried on chiefly with other ports and towns of Asia Minor, Syria, Bagdad, and Persia. The exports consist principally of dried fruits, cotton, silk, goats' and camels' hair, wool, rabbit and hare skins, and opium; and the imports of coffee, sugar, indigo, different kinds of manufactured goods, spirits, iron, steel, lead, and tin. In 1858 the value of the exports was \$11,725,250, and of the imports \$12,655,125. In 1855 1,805 sailing vessels, of an aggregate of 420,438 tons, entered the port. Steamers ply regularly between Smyrna, Constantinople, and several ports in the Mediterranean. Newspapers are published in 5 different languages.—Smyrna is a place of such antiquity that its early history is lost in fable. It seems to have been colonized by Æolians from Cyme, but

early fell into the hands of the Colophonians, and in the 7th century B. C. formed the 13th city of the Ionian league. According to Strabo, it was destroyed by Sadyattes of Lydia about 627 B. C., and remained in ruins for several centuries. It was rebuilt and enlarged by Antigonus and Lysimachus, successors of Alexander the Great, and became one of the first cities of that era. One of the 7 churches mentioned in the book of Revelation was situated at Smyrna, and Polycarp was its first bishop. The town was destroyed by an earthquake in A. D. 178, but was rebuilt by the emperor Marcus Aurelius. It afterward had many changes of fortune; and being occupied by a Seljookian chieftain about the end of the 11th century, it was nearly destroyed by the Byzantine fleet. It was again rebuilt, and the Genoese subsequently became masters of it and retained it till 1864. It was then taken by the Turks, captured by Tamerlane in 1402, and soon fell back into the hands of the Turks. It has suffered severely upon several occasions from both earthquakes and fires. In 1841 12,000 houses were burned; and in 1846 it was much damaged by an earthquake and many people were killed. Smyrna is generally supposed to have been the birthplace of Homer, and in ancient times it possessed a Homerium or temple to his memory.

SMYTH, a S. W. co. of Va., bounded S. E. by the Iron mountain range, and N. W. by Walker's mountain, and drained by the head streams of Holston river; area, 625 sq. m.; pop. in 1860, 8,952, of whom 1,037 were slaves. The surface is an elevated valley between Iron mountain range and Walker's mountain; the soil is very fertile. The productions in 1850 were 34,742 bushels of wheat, 201,222 of Indian corn, 139,580 of oats, and 100,410 lbs. of butter. There were 3 furnaces, 7 churches, and 600 pupils attending public schools. Limestone, gypsum, and salt are found. The value of real estate in 1856 was \$2,321,831, showing an increase of 48 per cent. since 1850. It is intersected by the Virginia and Tennessee railroad. Capital, Marion.

SMYTH, THOMAS, D.D., an American clergyman, born in Belfast, Ireland, in 1808. He was educated at Belfast and London, and in 1830 came to the United States, and soon after entered the theological seminary at Princeton, N. J. In Nov. 1831, he visited Charleston, S. C., and in 1832 became pastor of the 2d Presbyterian church in that city, where he still continues. Dr. Smyth has collected a library of 10,000 or 12,000 volumes of choice works, mostly foreign editions; and he has written a number of books, some of them controversial in character, such as "Ecclesiastical Republicanism" (12mo., Boston); "On the Prelatic Doctrine of Apostolic Succession" (8vo., Boston); "The Life and Character of Calvin Defended" (8vo., Philadelphia, 1844); "The History, Character, and Results of the Westminster Assembly of Divines" (12mo., New York, 1847); "Catechism of the Presbyterian

Church" (New York); and "The Rite of Confirmation." Others are more general, as "Be-reaved Families Consoled" (12mo., New York, 1845); "The Unity of the Human Races proved to be the Doctrine of Scripture, Reason, and Science" (12mo., New York, 1850); "Nature and Claims of Young Men's Christian Associations" (Philadelphia, 1857); "Why do I Live?" (New York, 1857); "The Well in the Valley" (Philadelphia, 1857); and "Obedience the Life of Missions" (Philadelphia, 1860).

SMYTH, WILLIAM HENRY, a British naval officer, born in Westminster, Jan. 21, 1788. His father was an American loyalist. He engaged at first in the merchant service, but in March, 1805, entered the royal navy as midshipman, and was in active service in the Pacific and Atlantic until 1810, when he rendered important aid in the defence of Cadiz, for which in 1813 he was raised to a lieutenantancy, and soon afterward appointed to a command in the flotilla under Sir Robert Hall detailed for the defence of Sicily. By order of the lords of the admiralty he made an elaborate survey of Sicily and the adjacent islands, which occupied him for several years, and resulted in the publication by the admiralty of an atlas of Sicily. As an accompaniment to this, Capt. Smyth published in 1824 a "Memoir descriptive of the Resources, Inhabitants, and Hydrography of Sicily and its Islands, interspersed with Antiquarian and other Notices" (4to.). He afterward completed the survey of the shores of the Adriatic sea, which had been commenced by Napoleon, and the results of the survey were published by the imperial geographical institute of Milan. He was employed by the lords of the admiralty in 1823 and 1824 in a survey of the coasts of Sardinia, and published a "Sketch of the present State of the Island of Sardinia" (8vo., 1828). He attained the rank of post captain in Feb. 1824, and settled soon after at Bedford, where he built a small observatory in his garden, and prosecuted astronomical investigations for several years, and in 1844 published a "Cycle of Celestial Objects, for the use of Naval, Military, and Private Astronomers" (2 vols. 8vo.). In 1853 he attained the rank of rear admiral. His most valuable work is entitled "The Mediterranean, a Memoir, Physical, Historical, and Nautical" (8vo., 1854), in which he gives in systematic and condensed form the results of his numerous surveys and observations on the physical geography of that sea.—His eldest son, WARRINGTON WILKINSON SMYTH, is mining geologist to the ordnance survey. His 2d son, CHARLES PIAZZI SMYTH, is astronomer royal for Scotland, and in 1856 transported a large collection of meteorological, magnetical, and astronomical instruments to the peak of Teneriffe, where he selected two stations, one 8,840, and the other 10,700 feet above the sea, and obtained important results detailed in his "Teneriffe, an Astronomer's Visit" (London, 1858). He has since written "Three Cities of Russia" (London, 1862).

SNAIL, the common name of the *helicidae*, a large family of gasteropodous mollusks, terrestrial and air-breathing. The number known is now so large that the treatment of the subfamilies and genera would require a volume. Restricting the name *helicidae* to such as have a well developed external spiral shell, the snails may be characterized as animals breathing air by means of branchial vessels spread like a network over the internal walls of a cavity in the anterior part of the body, covered by the shell, and communicating with the atmosphere by a small valvular opening on the right side; they have 4 retractile tentacles, the upper 2 the largest and having eyes at the apex; there is a dentated horny jaw on the upper lip, which is opposed by the tongue; the gullet is wide, with large white salivary glands on its sides, and the liver is well developed; the whole body is very glutinous; the locomotion is slow, by means of the ventral foot; they are hermaphrodite, with reciprocal impregnation. The shells are always external, vary much in form, and contain the entire animal; they have no operculum, the opening during hibernation being closed by a secretion from the mantle, which hardens into what is called the epiphragm; the shell is generally turned from left to right, the free edge to the right, but they are often reversed; the newly hatched young resemble their parents, and have a shell of  $1\frac{1}{2}$  whorls. They are sensitive to cold, and like moist places; the sense of touch is acute, especially in the tentacles, and they appear to have a sense of smell; they are nocturnal in habit, and feed principally on plants, though sometimes devouring each other. The reproductive season is toward the end of spring; the eggs, to the number of 30 to 100, are deposited in moist places, in natural or artificial holes; the young come out in 20 to 30 days. Snails are distributed very widely, from the northern limit of trees to Terra del Fuego, from the hot and moist plains to a height of 11,000 feet on mountains; some are cosmopolite, ranging wherever their food is found, and others are restricted within narrow limits. About 1,500 species have been described, some of which from their voracity are very injurious to vegetation, and some useful to man as food; they are very tenacious of life, and able to resist long droughts. A specimen of the desert snail of Egypt (*helix desertorum*), which remained dormant in the British museum 4 years, lived in the possession of one of the curators more than 2 years; some of the same species, shipped to Smyrna, Constantinople, Rio Janeiro, and Boston, and 7 months on the passage, were in full vigor when taken out, and some of the same, laid away in a drawer, were tolerably lively at the end of 3 years.—The genus *helix* (Lam.) is the type of the family. The Roman or vineyard snail (*H. pomatia*, Linn.) is a large species, of a reddish brown color, marked with paler bands; the animal was used as food by the ancient Romans, who reared them in parks,

and fattened them on cooked meat and flour, obtaining them from the islands of the Mediterranean; they are still eaten in many countries of Europe, especially by Roman Catholics during Lent, being considered as fish; great numbers are eaten in France; they are also recommended as ingredients in soups for consumptive persons. The reproductive internal organs, in the apex of the shell, consist of many parallel cæca, each of which has an external layer producing eggs, and an internal sac producing semen; the apparatus is very complex. The *H. aspersa* (Linn.), or common garden snail, originally from Europe, but now naturalized in most parts of the globe, is also used as food, when boiled in milk, for consumptives. These species when abundant are very destructive, laying waste whole gardens in a single night, always attacking the tenderest and most succulent plants; beside their natural enemies, mammals and birds, great numbers are killed by fires, inundations, sudden changes of temperature, felling of forests, cultivation of the land, and by hogs and poultry following the plough; the remedies for their depredations are the same as for the slugs. The largest of the American snails is the *H. albolabris* (Say), of a yellowish horn color, with white, broadly reflected lip; the shell has 5 or 6 whorls, with minute revolving lines and the umbilicus closed; in October they cease feeding, and select a place under some log or stone, where they fix themselves for the winter, mouth upward. For details on the American species of the family, see the work of Dr. A. Binney on the "Terrestrial Air-breathing Mollusks of the United States" (3 vols., Boston, 1851, and vol. iv., a continuation by W. G. Binney, Boston, 1859). The garlic snail (*H. alliaria*) has follicles whose secretion gives out a strong odor. Among other genera are *citrina*, *bulimus*, *pupa*, *chondrus*, *succinea*, *clausilia*, and *achatina*.

SNAKE. See SERPENT.

SNAKE BIRD. See DARTER.

SNAKE RIVER. See LEWIS or SNAKE RIVER.

SNAKEROOT (*polygala senega*, Linn.), a perennial plant of the natural order *polygalaceæ*, with a twisted branched rootstock, and several ascending or erect, simple or branching stems, which issue from its woody crown; its leaves numerous, lanceolate, and its spikes of greenish white flowers cylindrical and peduncled. The smaller roots are preferred in the drug, which possesses stimulating and tonic properties, and is used in pulmonary inflammation, catarrh, asthma, rheumatism, dropsy, and other complaints. The greater part of the entire order is bitter and their roots milky, properties observable in the European and American species, and from the latter circumstance they are called milkworts. Another variety of the snakeroot is the broad-leaved (*P. s.* var. *latifolia*, T. and G.), with a taller stem and larger leaves. Both are found in dry rocky woods and plains from western New England to Kentucky.—Several other plants bear the



name of snakeroot and have medicinal value, such as the Virginian snakeroot (*aristolochia serpentaria*, Linn.), a small plant with a perennial coarse-fibred rootstock, herbaceous stem, and lance-shaped, cordate leaves; flowers few, solitary, near the base of the stem; the calyx tube coriaceous, much bent, purplish brown; corolla wanting. It belongs to the birthworts, and is in repute for its aromatic stimulant properties; it grows in rich woodlands throughout the United States. The Canada snakeroot (*asarum canadense*, Linn.) belongs to the same family, and has large brownish purple flowers, and two broad reniform leaves; its rootstock is pungent and aromatic, and is employed as a stimulant and diaphoretic. The black or tall snakeroot (*cimicifuga serpentaria*, Pursh), of the crowfoot family, is a showy plant, with terminal racemes of white flowers, conspicuous in woodlands from Maine to Michigan and southward; its root is astringent and mucilaginous, and an infusion of it in a bruised state is employed in veterinary practice among neat cattle, but its medicinal value is probably overrated.

**SNAPPING TURTLE** (*chelydra serpentina*, Schweig.; genus *chelonura*, Fleming), an American species of fresh water chelonians, characterized by a large head, with both jaws strongly hooked and 2 barbels under the chin, short and pointed snout, the nostrils near together, and the eyes large, prominent, and far forward; the sternum is small, cruciform, immovable, and covered with 12 plates and 8 supplemental ones; the carapace oblong, depressed, more or less tricarinated, deeply notched behind with 3 points on each side of the central notch; the neck long and thick, with a warty skin; tail very long, surmounted by a scaly or tuberculated crest; the anterior limbs with 5 nails, the posterior with 4; the skin of the limbs above and below scaly. The head may be in great part retracted within the shell, whence it can be very suddenly extended by the long and extensile neck, but the limbs and feet are mostly exposed. The shell is dusky above, and the lower parts yellowish; it grows to a large size, attaining a length of more than 4 feet and a weight of 50 lbs.; it prefers sluggish and deep water in ponds or rivers, keeping principally at the bottom; it is very voracious, and feeds on fish, reptiles, and such aquatic birds as come within its reach, especially young ducks and goslings and wounded birds; it has been known to attack man, and is not unfrequently caught with hooks; its flesh is much esteemed for soups, though in the old animals it has a musky odor. It goes far from water to deposit its eggs; though an excellent swimmer, it is awkward on land, walking slowly, with the head, neck, and tail extended, raised on the legs like an alligator, whence it is called by the negroes alligator cooter; it is very savage if attacked, raising itself with such quickness on its legs as to elevate the whole body from the ground and enable it to make considerable hops, snapping with great ferocity

and quickness at any object coming within reach of its long neck; its bite is severe and tenacious. It is distributed from Maine to Georgia, and westward to the Mississippi, being replaced further west by the *C. Temminckii* (Troost; genus *gypochelys*, Ag.), characterized by a larger triangular head, rougher shell, and neck and limbs covered with spiny warts. In the northern states it lays its eggs, 20 to 40, between June 10 and 25, generally in the forenoon, and in captivity a month later; it excavates a hole at first directly down and then laterally, so that the widest part, where the nest is, is on one side; sometimes several holes are dug, before one is found to suit; the females lose their shyness at this time, and smooth the earth over with care after the eggs are deposited.—In some parts of the country, the soft-shelled turtles (*trionyxidae*) are called snapping turtles. The eggs in these species are nearly globular, about an inch in diameter, white, and with tolerably hard shells.

**SNEEZING**, a well known modification of the ordinary respiratory movements, accompanied by a violent expiratory effort, sending forth a blast of air from the lungs intended to expel some irritating substance from the nasal air passages. It differs from coughing in the communication between the larynx and mouth being partly or wholly cut off by the drawing together of the sides of the soft palate over the back of the tongue, so that the blast of air, by a convulsive movement, passes through the nose with more or less noise instead of through the mouth. It may be excited by acrid vapors, irritating liquids or solids, diseased secretions, or the simple entrance of air when the Schneiderian membrane is peculiarly irritable. The impression received by the branches of the 5th pair of nerves is transmitted to the medulla oblongata, whence is sent the motor impulse to the muscles concerned. It is sometimes apparently independent of consciousness and sensation; an impression of strong sunlight on the eyes by transference excites a tickling in the nose and the act of sneezing, and a half formed inclination to sneeze may be rendered effectual by looking toward the sun. This act is very common in a state of health, more so in an ordinary cold or the rose cold, and almost always in the first stage of measles. Medicines for producing sneezing, called sternutatories or errhines, are used in various forms of coryza, headache, chronic ophthalmia, and rheumatic and paralytic affections of the face, mouth, and throat, which they relieve by the increased mucous secretion, and sometimes by a bleeding at the nose salutary in cerebral congestions; such are tobacco, asarabacca (*asarum*), lily of the valley (*convallaria*), euphorbium, bayberry, aqua ammoniæ, arnica, and other irritating powdered roots and flowers.

**SNELL**, LUDWIG, a Swiss author and politician, born at Idstein in the duchy of Nassau, April 6, 1785, died at Küssnacht, on the lake of Zürich, July 5, 1854. He studied at the

university of Giessen, was from 1809 to 1817 professor at his native town, and afterward director of the new Prussian college at Wetzlar. On account of his liberal political views he was suddenly dismissed, and after a journey through Switzerland went in 1824 to England. He lectured in 1827 at the university of Basel on literature and the history of Greek literature, and from Basel went to Zürich, where he was naturalized, elected member of the grand council of the canton, and appointed professor at the university. He was subsequently professor of political science at the university of Bern till 1836, when he was exiled from the canton, as was his brother Wilhelm, an eminent jurist (born 1789, died 1851), on account of violent attacks on the then ruling conservative party. He was very active in the agitation for the expulsion of the Jesuits, and for the introduction of a new federal government; and he exercised by his writings a marked influence on the modern history of Switzerland. In the latter years of his life he devoted a great part of his time to an examination of the various systems of socialism. Beside other works, he published *Handbuch des Schweizerischen Staatsrechtes* (2 vols., Zürich, 1844), and the last volume of a work on the Kantian philosophy, *Handbuch der Kantischen Philosophie* (2 vols., Zürich, 1837), which had been commenced by his father and his uncle.

SNELLAERT, FERDINAND AUGUSTYN, the most prominent writer of the new Flemish school in Belgium, born at Courtrai, July 21, 1809. His first work was a prize essay on the history of Flemish poetry (*Ober de Nederland-sche Dichtkunst in België*, 1838). He founded the society for the cultivation of the Flemish language, and his *De Tael is gansch et volk* ("The Language is the People") at once called into existence a powerful Flemish movement. From 1840 to 1843 he published the *Kunst en Letterblad* ("Journal for Art and Literature"). He assisted in editing the last volumes of the *Belgisch Museum*, and was also one of the editors of the journal *De Eendracht* ("Harmony"). Among his best works is a brief history of Netherlandish (Dutch and Flemish) literature (*Kort Begrip eener Geschiedenis der Nederland-sche Letterkunde* (Antwerp, 1849), the second edition of which, under the title of *Schets eener Geschiedenis der Nederlandsche Letterkunde* (Ghent, 1850), has been introduced as a text book even in several colleges of Holland.

SNETHEN, NICHOLAS, an American clergyman, born at Fresh Pond (now Glen Cove), Long island, N. Y., Nov. 15, 1769, died in Princeton, Ind., May 30, 1845. Till after he was of age he aided his father in agricultural and other labor, and in 1794 entered the itinerant ministry of the Methodist Episcopal church, travelled and preached for 4 years in Connecticut, Vermont, and Maine, labored at Charleston, S. C., for a year or more, thence was ordered to Baltimore, where he attended the session of the general conference of the

church in May, 1800, and took a prominent part in favor of limiting the episcopal prerogative, a delegated general conference (his plan for which was finally adopted in 1808), and a preachers' anti-slavery tract society, and against the future admission of any slaveholder into the church. He afterward travelled with Bishop Asbury, as one of his assistants, for 4 years throughout the United States, acting as his private secretary. In 1804-'6 he was stationed in New York city, whence, having left the travelling connection, he removed to his farm on Longanore, Frederic co., Md. By his marriage he became the holder of slaves, but he was prevented by the laws from manumitting them until 1829, when they were duly emancipated. In 1809 he again became an itinerant, and was stationed successively in Baltimore, Georgetown, Alexandria, and on the circuit of his farm residence. While stationed in Georgetown he was elected chaplain to congress. He returned to farming in 1814, and remained on his estate from that time till 1829, when he removed to Indiana. Mr. Snethen was the first to introduce camp meetings into Maryland and New York, and he was preëminently a camp meeting preacher, distinguished for the far-reaching sonorousness of his voice, which Bishop Asbury used to call his "silver trumpet," and the eloquence and effectiveness of his discourses. In 1821 he began to write in favor of introducing lay representation into the Methodist Episcopal church. The refusal of this right by the general conference in 1828, and the expulsion from the church of many of its advocates, led to the formation of the Methodist Protestant church, in which Mr. Snethen bore a prominent part, and in connection with which he continued to travel and preach after his removal to the West till a short time before his death, residing principally in Cincinnati. He published 2 or 3 volumes which are out of print; and his writings are now (1861) in course of preparation for the press, to be comprised in 10 or 12 volumes, with a biography by his son, W. G. Snethen of Baltimore.

SNEYDERS, or SNYDERS, FRANCIS, a Flemish painter, born in Antwerp in 1579, died there in 1657. He was instructed by Henry van Balen, and became celebrated for his representations of animals of the chase and hunting scenes, which remain to the present day unsurpassed for freedom and natural energy of motion. Those in which violent action is depicted, as bear hunts and boar hunts, are the best. He was the friend and follower of Rubens, for whose pictures he frequently executed figures of animals, with fruit and other accessories, in such perfect harmony with the style and coloring of Rubens, that the work seems the production of a single hand. Jordaens availed himself of the talents of Sneyders in a similar manner, and both he and Rubens often conjointly painted the human figures in the pictures of their brother artist.

**SNIPE**, a well known group of wading birds, of the sub-family *scelopacinae*. It is characterized by a long, straight, slender bill, obtuse and flexible, covered with a soft, sensitive skin abundantly supplied with nerves toward the end; the upper mandible the longest, somewhat bent down at the end, and grooved on the sides, in which the nostrils are placed; the tongue long, slender, and pointed at the end, the oesophagus narrow, and the stomach very muscular; eyes far back in the head; wings moderate and pointed; tail short and rounded; legs short, feathered lower down than in most waders; hind toe small, elevated, but reaching the ground, the anterior long and slender, and free except in the genus *macroramphus*. Snipes are migratory and small-sized birds, going north to breed; they frequent marshy places and the margins of rivers and ponds, where they probe the soft mud perpendicularly with the bill in search of worms, insects, and larvæ; the nest is a slight hollow on the ground, lined with grass and sedge, and the eggs, usually 4, are placed with the pointed end inward; the young are able to leave the nest as soon as hatched; the flesh is considered a great delicacy, and the bird is a favorite with sportsmen. The sub-family includes the genera *macroramphus* (Leach), *gallinago* (Leach), *rhynchæa* (Cuv.), *scelopax* (Linn.), and *philohela* (Gray), of which the last two will be noticed under WOODCOCK.—In *macroramphus* the wings are long and pointed, with the 1st and 2d quills equal; the tarsi are longer than the middle toe, which is united to the base of the outer by a short web. The species are found in Europe and North America, occurring in large flocks near the sea, feeding on small mollusks, worms, and insects; they fly rapidly and irregularly with a quivering whistle. The gray or red-breasted snipe (*M. griseus*, Leach) is about 10 inches long and 18 in alar extent, the bill  $2\frac{1}{2}$ , and weighs  $3\frac{1}{2}$  oz.; the prevailing colors above are dark ashy, pale reddish, and black, with rump and upper tail coverts white; under parts pale ferruginous, with spots and bands of brownish black; the quills brownish black, the shaft of the first primary white; the young are dull white below, marked with ashy; the plumage is more gray in winter, and more red in summer. It occurs over temperate North America, in large flocks, occasionally going inland in autumn on the return from the north, where it goes to breed; the flight is rapid and strong, accompanied by a single mellow "weet;" the call note is a whistle; the flesh is not so good as that of the common American snipe.—In *gallinago* the tarsus is shorter than the middle toe, and there is no web. The American or Wilson's snipe (*G. Wilsonii*, Bonap.) is about  $10\frac{1}{2}$  inches long, with an alar extent of 17, the bill  $2\frac{1}{2}$ , and weighs 3 oz.; above the feathers are brownish black, spotted and edged with yellowish brown or ashy white; a black line from base of bill over top of head; throat and neck before reddish ashy, under

parts white, quills and tail like back, the latter widely tipped with bright rufous, with a narrow subterminal black band. It occurs over temperate North America, going in summer as far as Nova Scotia, where it breeds in June in the elevated moss-covered marshes; the eggs are yellowish olive, spotted with brown; they return to the south in October, and are very fond of the rice fields; they rarely visit the sea shore, and never the interior of woods; the cry resembles the syllables "wau-aik." They are fond of leeches and other food not generally coveted by man, though most epicures, ignorant of this, are in the habit of cooking and eating them, contents of intestines included. The great or double snipe of Europe (*G. major*, Steph.) is 11 or 12 inches long, varied with black and bright reddish above, the red arranged longitudinally, and whitish red below; the shaft of the 1st quill is whitish; it inhabits N. Europe. The common snipe of Europe (*G. media*, Steph.) is 10 or 11 inches long, with 2 blackish longitudinal bands on the head, the neck spotted with brown and fawn color, the mantle blackish with 2 longitudinal fawn-colored bands, the wings brown waved with gray, quill shafts brown, and lower parts white waved with blackish on the flanks; it flies very high, with a shrill cry; from its wavering flight it is generally difficult to shoot; its flesh is delicious, and, though fat, does not disagree with delicate stomachs. The jack snipe (*G. gallinula*, Leach) is  $8\frac{1}{2}$  inches long, and weighs about 2 oz.; it has only one black band on the head, the mantle has bronzed green reflections, and the flanks and chest are spotted with brown; there is a gray semi-collar on the nape. This species seldom rises until it is almost trampled on, and then flies but a short distance; it remains in the marshes of Europe all the year, frequenting the same place the whole time. The *G. gigantea* (Natt.), of Brazil, is 15 inches long, with a bill of 4 or 5.—In *rhynchæa* the bill is shorter and more curved, the 1st 3 quills equal and longest, the tertials as long as the quills, and the tail very short; the species are adorned with bright yellow ocellated spots on the quills and tail; they occur at the Cape of Good Hope, in the East Indies, and Australia. The Cape snipe (*R. Capensis*, Cuv.) is 10 inches long, variegated with black and cinereous; around the eye, a little way down the neck, pectoral band, and abdomen, white. The *R. Chinensis* (Bodd) resembles the last.

**SNORRO STURLESON**, or **STURLASON**, an Icelandic historian, poet, and statesman, and a Norwegian earl (jarl), born in Iceland, on the shores of Ilvammssíð, a small bay upon the W. coast, in 1178, murdered at Reykholmt, Sept. 22, 1241. His father, Sturla of Hvamm, as well as his mother, was of illustrious family. Both were descendants of ancient Norwegian kings, and connected by blood with the direct ancestors of the Norman conqueror of England. Snorro, carefully educated under the eye of one of the most learned men of the period, became

a proficient in Greek and Latin; but with a good taste highly remarkable in an age of universal deference to dead languages, he resolved to devote his genius to the elevation of his native tongue, independently of classic or foreign models. He is styled by historians of literature the "northern Herodotus." He was however not the earliest Scandinavian annalist; and it appears most probable that in his historical work he made large use of the writings of Ari Frode, fragments of whose Scandinavian histories, composed 110 years earlier, still remain. Scandinavian literature, however, is undoubtedly more indebted to Snorro Sturleson than to any other man. His genius, remarkable for comprehensiveness, was best displayed in letters. It is the more surprising that a man of this refined capacity was degraded by the most sordid passions; that his life was one of turbulence and immorality; and that his memory comes to us stained with vices wholly incompatible with the commonly accredited humanizing influence of letters. He became by marriage and inheritance the wealthiest individual in Iceland; and his riches and eloquence obtained for him the highest social importance. His residence was a fortified stronghold, and he appeared in the national assembly with a retinue of hundreds of armed followers. Traces of his sumptuous abode at Reykholt are visited by the modern traveller with amazement. Stone structures of finished elegance for hot baths still exist, supplied from boiling springs through an aqueduct of hewn stone 500 feet in length. On being elected to the chief magistracy, he gave proof of great legal attainments; and in 1213 he made a first essay in poetry, producing an ode to a Norwegian warrior of the day, which was requited by sumptuous presents. This poem was followed by others of the same description, one of them composed in honor of the king of Norway, Haco IV. (sometimes numbered V.). Snorro meanwhile had been received with great honors in the mother country and in Sweden. On the occasion of a second visit to Norway he was made an honorary marshal of the court, and upon re-embarking for Iceland was loaded with rich presents, compliments which elicited further odes and poems. Iceland meanwhile was falling from her old integrity. Faction and disorder prevailed throughout the republic; and the king of Norway seized the moment to advance his designs for the subjugation of the island. Snorro, whose patriotism was highly questionable, became involved in desperate domestic feuds, and in 1237 appeared in Norway as a fugitive. The king created him a jarl, but presently found reason to withdraw his confidence. Snorro returned to Iceland pursued by the royal vengeance. Emissaries were employed to seize him and send him in irons to Norway, but he was murdered at Reykholt by his 3 sons-in-law. His most important work is entitled *Heimskringla*, chronicles of northern kings, a compilation rather than an

original work, embodying ancient traditional legends, scaldic songs, genealogies of princes and roving chieftains, and narratives from various oral sources. The Younger Edda, a collection of myths of gods, and a sort of *Ars Poetica* for the use of younger scalds, also bears the name of Snorro Sturleson, but was undoubtedly a compilation also. The original Icelandic text of the *Heimskringla* was first printed by Peringskiöld in 1697, though a Danish translation had been current 100 years before. The last edition is by Schöning, in Icelandic, Danish, and Latin (6 vols., Copenhagen, 1777-1820). There is a spirited English translation, "The Heimskringla, or Chronicle of the Kings of Norway," by Samuel Laing (3 vols. 8vo., London, 1844), and numerous versions in all the northern languages.

SNOW, the vapor of the atmosphere, congealed by cold, and the particles aggregated together in flakes. It has been observed in process of formation at various elevations above the surface of the earth. Mr. Green, the aeronaut, encountered a severe snow storm at the height of a mile and a quarter; and in very cold regions it has been seen to form in the moist atmosphere of warm rooms into which a current of cold air was allowed to enter. Though essentially a meteor peculiar to the polar and temperate regions of the earth, snow is produced in all latitudes, as appears from its accumulation upon high mountain summits under the equator; but the heat of the equatorial regions prevents its descent to the lower levels. In North America it is rarely seen S. of lat. 80°, and on the eastern continent below 86°. At times it has fallen in Savannah in lat. 32°, and a recent considerable fall of snow occurred at New Orleans in lat. 80°. A remarkable instance is recorded of a fall of snow to the depth of several inches in Canton, China, in lat. 23°, in Feb. 1836. For several days previously the wind had been blowing from the N., and the thermometer at the time of the appearance of the snow had fallen to 87°, which was much lower than the extreme temperature of other winters. Approaching the polar regions, and in the more elevated portions of the earth's surface, the amount of snow that falls rapidly increases. In the N. part of the United States and of Russia, and in the Scandinavian countries, it sometimes averages a depth of 6 feet for a considerable period. About Lake Superior more or less snow falls almost every day during the winter, and as it rarely thaws the accumulation becomes very great. The first fall is usually before the ground has frozen, and the snow being an excellent non-conductor of heat, it protects the surface beneath from the intense cold of the winter of that region. Hence it is that vegetables left in the ground, as turnips and potatoes, may be dug at any time after the cold weather has set in by first removing the snow over them. It is a common occurrence for crops of these roots to renew themselves without successive plant-

ings. In districts not so far N. a good depth of snow through the winter is regarded as most beneficial to the farmer by protecting the roots of the grasses and winter grains from the severe frosts. To the animals of the forest it is destructive by burying beyond their reach the vegetable productions upon which they depend for their sustenance. The woods themselves are occasionally greatly injured by the accumulations of heavy masses of snow upon the limbs of the trees. This occurs when a great body of moist snow falls in a still atmosphere at a time before the trees have entirely shed their leaves, or in the spring after the putting forth of the new leaves. The moist snow then heaps itself up in conical-shaped piles upon every object it reaches, and limbs and trees are often prostrated beneath the accumulated weight. The dark evergreen forests after such a fall of snow present the most picturesque scenes of a northern winter. Where deep snows prevail, they are not regarded as serious impediments to travel. A track once broken and consolidated, it forms an excellent road for sleighs, often renewed by fresh accumulations and hardened by partial thawings succeeded by freezing of the surface. The deep snows of the extreme north are often covered with a thin crust upon which men travel with ease and rapidly upon snow shoes (see SNOW), and thus perform journeys through wild regions more easily than in summer. The camp at night is in an excavation made in the snow, the walls of which afford a secure shelter from the wind, and retain by their non-conducting property the warmth of the fire made at one end of the space they enclose.—Snow flakes have attracted much attention in consequence of the elegant forms they often exhibit when seen under the microscope. Sometimes the particles are found to be merely granular without distinct shape, and are again noticed in globular and in irregular forms. But under suitable meteoric conditions, the delicate icy atoms formed from the vapor float as freely in the atmosphere as any newly formed precipitate in a liquid medium, and adjust themselves, as they come in contact with each other, after the system of crystallization to which they belong, producing a great variety of mathematical figures within this system. Agitation, as by winds, disturbs the freedom of movement, and the aggregations are then necessarily irregular in shape. The primitive crystal of ice being a rhomboid with angles of  $60^\circ$  and  $120^\circ$ , the arrangement of the atoms is in figures formed upon these angles. Usually little spicula appear, diverging in 6 rays from a centre and forming stars or stellar plates, the diameter of which is only from  $\frac{1}{2}$  to  $\frac{1}{4}$  of an inch. The nucleus of the star is often a hexagonal plate, from the angles of which proceed the 6 rays; and if the outer points of these be connected by lines, the hexagonal figure is repeated. Accretions of spicula upon the rays are formed always on the angles named, but in such manner as to produce at

different times a great variety of complicated figures. Sometimes the rays present filaments like those of feathers branching from the main stems, and these filaments again present still more delicate ones shooting out at the same angles, all arranged upon the same extremely thin plane. Dr. Scoresby, in studying this phenomenon in the arctic regions, figured 96 varieties of forms, which he divided into classes, designated as lamellar, spicular, and pyramidal. The forms changed on different days and under different states of the atmosphere. Prof. Jacob Green describes several forms and refers to the writings of previous observers in an article published in the 2d volume of the "American Journal of Science," p. 837. Many figures of snow crystals are represented in the report of the British meteorological society of May 22, 1855, which were prepared by their secretary, Mr. Glaisher, from his studies of the snows of the great storms of January and February, 1855, in the vicinity of London. The primary figure or base of each crystal he "determined to be a star of 6 radii, or a hexagon of laminae, and the compound varieties to include combinations of spicula, prisms, cubes, and rhomboids aggregated upon and around the central figure according to the degree of its complexity."—The extreme lightness of the flakes of snow, so different from the density of ice, is owing to the loose manner in which the particles are aggregated together; while the whiteness is a result of the congregated reflections of light from the innumerable small faces of the crystals. The same effect is produced when ice is crushed to fine fragments. When snow is partially consolidated by superficial thawing as it falls, and is then congealed again, the product is known as sleet. Hail is produced by the sudden freezing of rain drops passing through a cold stratum of air. Snow as it falls may be either dry, as occurs in a very low temperature, or the flakes may be moist by being nearly of the melting temperature. In the former condition they will not adhere together; but in the latter the snow is readily pressed into a dense mass or rolled up into balls, which rapidly increase by the gathering of more snow. Such are some of the avalanches which roll down the sides of snow-covered mountains. (See AVALANCHE.) Snow balls have been known to form naturally by the wind rolling the falling snow, sometimes, it appears, in the air itself, and then over smooth icy surfaces. The masses thus gather in ovoid cylinders sometimes 15 inches or more in diameter. Several remarkable instances of this kind are recorded in the "American Journal of Science," vol. ii. p. 132, and vol. vi. p. 162. The nature of the changes experienced by snow in its conversion into ice has been considered in the article GLACIER, vol. viii. p. 271.—The phenomenon of red snow has been occasionally observed from ancient times. Pliny explains it by the effect of age. De Saussure, who witnessed it on the Alps in the last century, believed that the coloring matter was the pollen

of some alpine plants. It is now known to be of common occurrence in those mountains during the spring months, and it is also found in the mountains of the arctic regions. The coloring matter is in fine grains of a lively red, which penetrate 2 or 3 inches into the snow, and occur chiefly where the snow lies in sheltered depressions, deepest near the centre and disappearing toward the borders. It has been examined by many naturalists, and Dr. Wollaston first ascertained that it was composed of minute spherical globules, having a transparent covering, and divided into 7 or 8 cells filled with a red, oily-like liquid, which is insoluble in water. The size of the globules is from  $\frac{1}{1000}$  to  $\frac{1}{100}$  of an inch in diameter. Within the liquid have been observed moving spores. The substance appeared to be the same, according to Mr. Bauer ("Philosophical Transactions," 1820), whether collected on the shores of Baffin's bay or in New Shetland; and he considered it to be a fungous growth of the genus *uredo*, which he named *U. nivalis*. By later investigations the substance has been shown to include several species of animalcules, among which the most abundant is that named *pholidina roseola* by Ehrenberg. The globules seen through the transparent body are the ova.—The snow line upon mountains, which is the lowest limit in which the snow continues permanently in all seasons, though obviously dependent for its elevation upon the contour of the surface, the situation of the slope with respect to the incidence of the sun's rays, and the character of the surrounding country, and being also variously affected by the nature of the prevailing winds and other atmospheric agencies, is still approximately represented for the different latitudes by a diagram of two lines, one horizontal standing for the level of the sea, and divided in each direction from the centre toward the extremities or poles into spaces of 10° each, and the other being an arc of an ellipsoid rising from lat. 80°, where the snow line is at the general surface of the earth, to 1,000 feet at 70°, 5,000 at 60°, 6,500 at 50°, 10,000 at 40°, 13,000 at 30°, 15,000 at 20° and 10°, and at the centre or equator to 16,000 feet. The local variations from this are often very striking. Thus on the Andes the height of the snow line is sometimes 16,500 feet at 10° from the equator, and 17,000 at 20°, from which greatest elevation it descends to 14,000 feet at 30° and to 16,000 at the equator. In lat. 33° S., in Chili, it was found to be at 14,500 to 15,000 feet, and in the island of Chiloe, in lat. 43°, 6,000 feet, facts which are explained by the different character of the climate of the two regions as to clouds and moisture. Still more remarkable discrepancies have been noticed in the Himalaya. Upon some of the peaks on the S. side of the chain, as in Sikkim, in lat. 27° 30', the snow level has been found at 16,000 feet and even less; while on the mountains near the Karakorum pass, in lat. 35° 30', Dr. Thomson found the snow line at 20,000 feet,

and vegetation up to 18,500 feet. This appears to be owing to the exposure of the southern portion of the range to the moist winds of the S. W. monsoon, which thus receives profuse supplies of snow and rain that give fertility to the districts below, so that they are covered with heavy forests and grassy lands. A covering of this nature is unfavorable to the absorption of the heat of the sun, and little warmth is reflected to the hilly districts above. But on the N. side of the range a powerful influence is felt from the proximity of the barren and arid wastes of Thibet, and the heat reflected from the burning sands is most rapidly absorbed by the snows of the mountain sides, causing them to disappear and the snow line to reach its highest level. A similar effect was noticed by Humboldt in the Andes of Chili, where on the E. side, exposed to the moist S. E. trades, he found the snow line at 15,900 feet, and on the W. side, over the arid region stretching from the Andes to the Pacific, it reached an elevation of 18,500 feet.

SNOW BIRD, a well known member of the finch family, and genus *junco* (Wagler). With the general characters of the finch family, the middle toe is shorter than the short tarsus, the outer the longest; the wings are rather short, and the tail slightly notched; the 2d quill is the longest. The common snow bird (*J. hyemalis*, Scater) is about 6½ inches long, and 9 in alar extent; the upper parts are nearly uniform dark plumbeous, darkest anteriorly, without any red in the interscapular region; lower parts white; the external 2 tail feathers white, the 3d white margined with black. It is found from the eastern United States to the Missouri and the Black hills of the west, and from Louisiana to the fur countries. It appears in New England from the south early in April, while the ground is covered with snow, going north to breed, and returning south late in autumn; from its gentleness and tameness it is looked upon here much as the robin is in England. They are found in small families, which usually keep by themselves, often visiting farm yards and hopping after domestic poultry, and in cold weather retiring into holes in hay stacks. They are fond of grass seed and berries; the flesh is delicate and juicy, and is often sold in the New Orleans market; the spring notes are agreeable. The nest is made upon the ground, the entrance generally concealed; the eggs are 4,  $\frac{1}{2}$  by  $\frac{1}{4}$  of an inch, yellowish white with numerous small reddish brown dots. A nearly allied species in the Rocky mountains is the *J. caniceps* (Baird), having a reddish spot in the interscapular region but not on the wings. On the Pacific coast is the *J. Oregonus* (Scat.), head and neck sooty black, a chestnut patch on the back and wings, and the belly pure white.

SNOW BUNTING. See BUNTING.

SNOW SHOE. See SHOE.

SNOWBALL, in botany, the sterile cymes of the flowers of the *eburnum opulus* (Linn.), produced by cultivation and continuing perma-

nent, and known as the *V. o. var. sterilis* of De Candolle. Its cymes or flower heads become on expansion globular by the pressure of the florets against each other, and readily suggest the trivial name. In this condition they contrast finely with the abundant foliage, and render the shrub, when trained to a single stem like a small tree, very ornamental. Ordinarily the species produces its cymes with only a single exterior row of barren flowers, the remainder being small and fertile and succeeded by an abundance of bright red berries or drupes which are ovoid in shape and 1-celled and 1-seeded. They contain a thin acid pulp, and are used as a substitute for cranberries, from which circumstance the plant is known as the cranberry tree or high bush cranberry. The snowball viburnum is one of many species of a genus of the *rubiceæ*. It is a native both of Europe and North America. A garden variety with variegated yellow and white foliage is known. The species are raised from seeds, and the varieties from layers and suckers.

**SNOWBERRY** (*symphoricarpos racemosus*, Mx.), an elegant American shrub of the honeysuckle family or *caprifoliaceæ*, much prized in gardens. Its stem is slender, 2 to 4 feet high, and has numerous slender branches, the leaves 1 to 2 inches long, broadly ovate, smooth above and pubescent beneath; the flowers produced in close clusters, the calyx persistent, the corolla bell-shaped, 5-lobed, stamens 5, ovary 4-celled, berry brilliant white, 2-seeded. It is easily raised from the seed or from suckers, which spring profusely from the roots. It occurs naturally in the northern and western states.

**SNOWDROP** (*galanthus nivalis*, Willd.), a pretty and favorite early flower belonging to the amaryllids, indigenous to Europe in meadows and on river banks. There are 3 varieties, the single, semi-double, and double, and they are cultivated for their charming effect, blossoming from the last of February to the beginning of April. The snowdrop has a small white bulb, 2 erect, obtuse, keeled, glaucous leaves, from the midst of which issues a slender flower stalk 5 or 6 inches high, bearing a solitary white blossom of 6 parts, 3 of which are shorter, heart-shaped, and striped interiorly with greenish lines. The bulbs should be planted in the autumn in clumps of 6 or 8, or set in rows on some sunny bank where they will be conspicuous in the spring. Every few years they will need lifting from the ground and resetting on account of their rapid increase. Another species with plaited leaves (*G. plicatus*, Bieberstein), is a native of the Crimea.

**SNOWDROP TREE** (*Halesia*, Linn.), the common name of a genus of fine deciduous shrubs or small trees with large leaves and showy white flowers, belonging to the natural order *styracææ*, and found in rich woods and on river banks westward and southward. There are 3 species noticed by botanists, of which the 4-winged (*H. tetraptera*, Linn.) is more commonly seen in cultivation. Its flowers appear

from March to May before the leaves, and are bell-shaped in form, the corolla consisting of 4 divisions or petals united at base and inserted on an obconical toothed calyx. The fruit is a dry 4-winged drupe, with 1 to 3 cylindrical seeds. It grows rapidly under cultivation, preferring a moist soil, and is readily raised from fresh seeds, layers, or suckers.

**SNOWFLAKE**, the common name of elegant bulbous garden flowers of the order of amaryllids and genus *leucojum* (Linn.), natives of Europe. In general aspect they resemble the snowdrop, but beside being of larger dimensions they have specific differences. The summer snowflake (*L. æstivum*) is most commonly seen in the flower border, having many lanceolate linear leaves issuing from a sheath, in the midst of which rises the flower stalk bearing several blossoms, the sepals and petals 6 in number, distinct to the base, and of equal length. The spring snowflake (*L. vernalum*) is similar, but bears a solitary flower; the autumnal (*L. autumnale*) is a more delicate species, and difficult of cultivation. The prevailing quality of the snowflakes is narcotic. In cultivation they are treated like the narcissus.

**SNUFF**. See **TOBACCO**.

**SNYDER**, a new central co. of Pennsylvania, formed out of part of Union co., bounded E. by the Susquehanna river; area, about 260 sq. m.; pop. in 1860, 15,035. The surface is hilly and the soil fertile. Iron ore and coal are found in great abundance. There are 5 newspaper offices, and in 1860 there were 4,285 pupils attending public schools. The only railroad is that of the Trevorton coal company. Capital, Middleburg.

**SOAP** (Lat. *sapo*), a chemical compound of vegetable or animal fatty substances with soda or potash, employed, on account of its property of loosening and dissolving greasy and other matters, as a detergent or cleansing article for the toilet, for washing clothes, and similar purposes. When the method of making it became known is not ascertained. In the Old Testament mention is made of soap in Jer. ii. 22 and Mal. iii. 2; but the Hebrew words thus translated mean respectively the lye salt potash, commonly made from the ashes of plants, and the salt soda, better known as a mineral product. Lyes or solutions of these salts were used for the sake of their active detergent qualities, as we now use the soaps, before the method of softening down their too great causticity by causing them to combine with oils or grease was discovered. A natural alkaline water found in Armenia is said by Strabo to have been used for washing clothes; and with the alkali obtained from such waters the ancients prepared ointments by the intermixture of oils, thus approaching very closely to the invention of soap. The want of this material was supplied by earthy matters, as the clays which have the property of absorbing grease from other substances, and are still used by fullers in cleansing cloths. Ammoniacal waters pro-



duced from urine, which was generally collected for this purpose, were known to have a powerful detergent action, and were largely employed by the scourers of clothes who carried on their occupation in the vicinity of the cities. The juice of a certain plant called by the Romans *struthium* was also used to some extent for the sake of its saponaceous qualities. Even the ancient Egyptians, so well skilled in numerous other useful arts, appear to have been unacquainted with soap; and the first certain reference to it in history is by Pliny, who ascribed its invention to the Gauls, and gave to the Germans the credit of manufacturing both the hard and soft varieties. Through them the Romans learned the art of making it, but for a long time the material seems to have been valued more as a wash for the hair than for its general detergent applications. Pliny names the materials employed, as tallow and the ashes of the beech and yoke elm in preference to those of any other woods. The inhabitants of Pompeii possessed at least one complete soap boiling establishment, which, when brought to view after having been buried more than 1,700 years, was found to contain soap still in good preservation. Some natural productions possess the qualities of soap; such are the berries of the soap tree, *sapindus saponaria* of South America and the West Indies, and the bark of the *quillaja saponaria* of the *spirææ*, which has been imported to some extent into Liverpool from South America for washing woollens, and found to be quite equal in strength to the best yellow soap. The bark is remarkably heavy, containing 14 per cent. of ashes, of which 2.6 per cent. are small crystalline needles of carbonate of lime. The mucilaginous juice of the soapwort, *saponaria officinalis*, a common plant along the roadsides, and known as bouncing bet, forms a lather with water; and in England the plant is sold for scouring and cleaning dresses. Other plants of the same natural order, *caryophyllaceæ*, possess the same property, as some belonging to the genera *dianthus* and *silene*. In California a small shrub, *phalangium pomaridianum*, grows abundantly all over the country, which is in general use for soap, and is even preferred to the artificial product. It never grows more than a foot high; the leaves and stalks fall off in May, and the bulbs remain in the ground all summer. They are dug up, stripped of their husks, and rubbed upon the clothes when these are in the water to be washed. A thick lather is produced, and the odor is like that of new brown soap. From the roots of the soap plants a peculiar substance called saponine has been extracted, to which a property of making emulgent is attributed. It has also been found in the bark of the *quillaja saponaria* of Peru. See a paper by Ferdinand Lebeuf in the *Comptes rendus*, vol. xxxi. p. 652, in which it is recommended for pharmaceutical and other uses. In the Malayan islands the bark of the gogo tree (*entada suraetha*) is much prized for toilet use.

—The principle upon which the manufacture of soap, or "saponification," is based, is the decomposition of the oily body by the alkali, and the combination of the latter with the oily acids, the glycerine which was previously combined with these acids being set free and lost, at least in the hard soaps. Thus the soaps are salts, and may be designated as stearates and oleates of soda or of potash, or margarates and oleates of these alkalies, according to the character of the fats employed in their manufacture. Some liniments and other pharmaceutical compounds of the fatty acids with bases have also been known as soaps; such are the preparations of ammonia and olive oil, known as volatile liniment, of oxide of lead and olive oil, constituting the plaster diachylon, &c. But the name soap is now limited exclusively to those compounds used for washing purposes. The various sorts possess the following general qualities: a taste slightly alkaline, especially in the soft soaps; a peculiar smell; a greater density than that of water, in which fluid they consequently sink; solubility in water and alcohol, greater in hot than in cold, and most decided with the potash soaps; and the production when beaten up with a little water of a white lather or froth, which consists of thin films of soap separated by air bubbles. Their aqueous solutions are decomposed by acids, which seize upon the alkali, and displace the oily acids, and these being diffused through the water give to it a milky appearance. Various salts of lime, magnesia, and of the metals also decompose the soaps; and their presence is the cause of the peculiar effect called hardness noticed in many natural waters, when an attempt is made to produce a lather in them with soap. The alcoholic solution, called the tincture of soap, is a convenient test for determining the presence of lime in water, or rather the degree of hardness from whatever foreign admixture; and a special table has been prepared by Prof. Clark of England, by which, with the use of a tincture of known strength, added in known quantities until the hardness disappears and a lather is produced, the relative hardness of the water is determined and is expressed by its appropriate figure.—The processes of manufacture of the different sorts of soap are very various, as are also the materials employed. The alkali used in the United States is often caustic soda, which is directly dissolved in water to give a lye of the desired strength. This, unquestionably the simplest plan, is not practised in Europe. The method there, and in general in this country also, is to employ a carbonated alkali, as soda ash, and first obtain from it a caustic lye by the action of quicklime in removing and appropriating its carbonic acid. The lime and soda are introduced in alternate layers into iron tanks provided with a false bottom which is perforated with holes, and the whole is then filled with water and left for 12 to 18 hours. The liquor is then drawn through at the bottom

and preserved, and the process is several times repeated with fresh portions of water until the soda is exhausted. So when crude ashes are used to produce the lye, quicklime is introduced with them into casks and water is passed through the mixture, as practised in the manufacture of potash. (See *POTASH*, vol. xiii. p. 517.) It is stated that the alkaline constituents of sea weeds have been conveniently extracted for the manufacture of soap without first reducing them to ashes, but by merely dissolving them in alkaline lyes. Of the two alkalies used in making soap, soda is employed for the hard soaps, and potash is more particularly fitted for making the soft, semi-fluid varieties. But it is not upon the alkali alone that the soaps depend for their degree of hardness. The more solid fats, as tallow and suet, whose melting points are the highest, must be used with soda for the hardest kinds of soap, while the more fluid varieties, which contain the most oleic acid, will give softness even to the soda soaps, and with potash furnish products of the thinnest consistency. The soaps made with what are called weak goods, as kitchen fat, bone fat, horse oil, &c., require to be hardened, and a method was discovered by Dr. Normandy of doing this by the introduction of a small quantity of fused crystals of sulphate of soda. The reverse process of softening the too hard soaps is effected by the introduction of rape oil or linseed oil, or the addition of rosin to the tallow used in the manufacture. Rosin alone has the property of forming a viscid soapy mass with soda; but it cannot neutralize the caustic properties of the alkali, and can therefore be used only as an auxiliary, taking the place of a portion of the grease. In the manufacture of what is called yellow or rosin soap, a proportion of rosin equal to  $\frac{1}{3}$  or  $\frac{1}{4}$  the weight of the tallow is added in the latter stage of the process in the condition of a coarse powder, and is well incorporated into the boiling caustic lye by stirring. All soaps retain a considerable proportion of water, the least quantity, as in the foreign Castile soap sold by the apothecaries, being about 14.5 per cent., and in other soaps varying from 25 to 50 per cent. Coconut oil gives to soaps made with it an extraordinary capacity for absorbing water, and yet remaining solid. The composition of a variety made in London has been found to be: water 73.5, coconut lard 22.0, and soda 4.5. With this peculiar soap linen could be washed in sea water. In consequence of this property of coconut oil, it has been extensively introduced into the manufacture of soap of late years, enabling the producer to dispose of large quantities of water at the price per pound of soap. Ordinarily good hard soaps contain from 30 to 35 per cent. of water, 60 to 70 per cent. of fatty acids and rosin, and 6 to 8 per cent. of soda. As the soap dries by age it loses weight by the evaporation of the water, and improves in quality as it gains in hardness to a certain extent, and becomes less soluble. If it become too dry,

it may be rendered softer by exposing it for a time in a moist place. The manufacturer finds it for his interest to introduce all the water it will contain, weigh the soap as soon as made, and pack it in boxes which are marked with the original number of pounds. In the soda or hard soaps the water is chiefly held in chemical combination, rendering the salts hydrates. In the soft soaps the condition of the water is more that of mechanical mixture. In the manufacture of soap upon a large scale, the fatty substances are selected rather according to the abundance of the several sorts than with reference to their special qualities. In the S. of Europe the inferior sorts of olive oil are most advantageously applied to the manufacture of hard soap, but in the northern countries tallow is more readily obtained. This is largely imported into England from Russia, and is used with soda for the white soaps, from 10 to 14 cwt. being required for every ton of soap. Palm oil is also imported for the same use. In the United States sperm and fish oils of different sorts have been found among the cheapest materials; but the inferior kinds of soft soap made with them are apt to retain a disagreeable smell, which is imparted to the clothes washed with the soap, and can neither be masked nor removed until they are washed again. The same objection must attend this application of the rock oil or petroleum. Lard oil, which is nearly pure oleine, is also very extensively used in the United States. Many of the vegetable oils beside those of the palm and olive are used in different countries for making soap, and some are selected on account of their peculiar properties; thus, hempseed oil has been much employed in Europe on account of a favorite greenish color it gives to the soap, and sweet almond oil for the sake of the pleasant odor it imparts. Castor oil and spermaceti produce soaps resembling those made with palm oil, emollient and well suited for the toilet. Lard soaps are very white and solid, and are also among the most esteemed toilet soaps. The drying oils generally make inferior kinds of soap, soft and flabby. For ordinary soft soaps all sorts of greasy matters are largely collected.—The manufacturing process for the white hard soaps, as very generally conducted, commences with the introduction of about a ton of the fatty material, together with about 200 gallons of the weakest of the soda lyes (of specific gravity 1.040), into one of the large boilers, which by steam heat is gradually brought to the boiling point. After boiling 3 or 4 hours the contents of the caldron have become viscid, so that portions taken out may be drawn into threads; the lye has yielded its alkali to the grease, and is said to be spent. The addition of a quantity of common salt causes it to separate from the soapy compound, which is quite insoluble in the saline solution upon the top of which it collects. The fluid portion can then be drawn off, carrying with it the glycerine and soluble salts as waste, after

which a fresh supply of stronger lye is introduced; and the operation is thus repeated about 8 times a day for several days, with lyes of increasing strength, the last having a specific gravity of 1.160. When at last it is found that a portion of the mass taken out and squeezed between the thumb and finger presents no appearance of grease and has a slightly alkaline taste, the saponification is known to be completed. If yellow soap is to be made, the powdered rosin is now introduced to the extent of  $\frac{1}{4}$  or  $\frac{1}{2}$  of the fatty materials, and the boiling is renewed with a fresh portion of strong lye, accompanied by stirring with a rake. The settlings caused by the rosin are washed down by successive applications of weak lyes, and form an impure soapy layer, which remains by itself at the bottom and is known as "niger." Palm oil tends to correct the peculiar odor of the rosin in soap, and so does rancid tallow, either of which may be advantageously employed for this purpose among the other greasy materials. As the completion of the saponifying process does not leave the soap in proper condition for the market, it has to be subjected to another process called "fitting." When separated from the last strong lye, it is again dissolved by boiling in a weak lye or in water; and when this is done very strong lye is added and the boiling is continued for a considerable time, during which the workmen are occupied with shovels in beating down the frothing mass. By this operation the colored impurities settle to the bottom, and when the frothing has subsided the soap assumes a uniform pasty consistence. The lid of the boiler is then shut down, the fire extinguished, and the contents are left to cool and settle for 2 or 3 days. The semi-fluid soap is finally ladled out into rectangular receptacles or moulds called frames, made of cast iron or of wooden bars, the latter being built up crossing each other at the 4 corners till the well thus enclosed sometimes reaches a height of 12 feet, and contains as much as 2 tons of soap. It is left to cool and solidify into large blocks in these frames, though to give it a finer grain, and prevent its becoming too hard, water is sometimes introduced in small quantity, and the mass is vigorously stirred with a wooden paddle or crutch until it is nearly cold. When it has hardened so that it will not yield to the pressure of the finger, the iron sides or wooden bars of the frames are loosened from their fastenings and taken off, leaving the great blocks standing upon the floor, about 45 inches in length, 15 in width, and from 5 to 12 feet high. Each mass is then marked round in lines with a toothed instrument like a rake, and is cut into smaller blocks by drawing a wire through. These blocks are then subdivided in the same way till they are reduced down to the size of the bars required. These are then piled upon each other crosswise in an open manner, and left in the drying room. The soap well known in England as mottled or marbled soap is made by omitting the fitting

process, and pouring the viscid mixture directly into the frames. The impurities called niger, which are of a ferruginous character derived from a trace of sulphuret of iron in the last lye, remain diffused through the mass in streaks or veins of a bluish color, and their presence was formerly regarded as a guaranty that no undue quantity of water had been introduced, as this would inevitably destroy the marbling. In other soaps water is sometimes added in considerable quantities after they have been introduced into the frames. The mottled appearance is however ingeniously imitated by the introduction of ultramarine or of oxide of manganese in soaps made with cocoanut oil. The well known Castile soap, which is made with olive oil and soda, is prepared both white and colored. The best kinds of the former contain about 21 per cent. of water; the marbled is a stronger and more economical soap, containing only 14 per cent. of water, is harder, more alkaline, and more constant in its composition than the other; but it retains the impurities from which the other is free. The fancy or toilet soaps are generally prepared directly from their ingredients, except in Great Britain, where the process employed in their manufacture consists of remelting and clarifying curd or white soap, and adding such perfumes, colors, &c., as may be required. The original Windsor soap was manufactured with mutton tallow, but on the continent from 20 to 85 per cent. of olive oil is mixed with the tallow. The perfumes are 6 parts of oil of caraway and 2 of oil of bergamot to 1,000 parts of the soap. Soaps are colored by mixing mineral paints into the melted mass, as vermilion for the pink varieties, artificial ultramarine for the blue, ochres for the brown, &c. In marbling the fancy soaps vermilion or ultramarine is rubbed with olive oil or soap, and a small portion taken up with a palette knife is pushed into the melted mass and moved about. Transparent soap is made from the kidney fats and pure soda, dissolving the soap in alcohol, filtering, and evaporating to the proper consistency for moulding. It is often colored with turmeric. Soap balls are prepared by dissolving soap in a small quantity of water, and then working it up with starch into a mass of the proper consistency. The popular shaving soap known as Naples soap is said to be prepared by first saponifying mutton tallow with lime, decomposing the compound thus formed by adding a mineral acid, which unites with the lime, setting the fatty acids free, and then causing these to combine with caustic potash by ebullition. The composition of this soap is thus given for 100 parts: fatty acids, 57.14; potash combined with fatty acids, 10.39; sulphate of potash, chloride of potassium, with a trace of carbonate of potash, 4.22; silica, &c., 0.46; water, 27.68; loss, 0.11. Several improvements in the manufacture of soaps have been recently patented by Mrs. Rowland of London. These consist chiefly in the introduction of certain chemicals into ordinary

soaps, in order to increase their deterative properties. Ammonia, spirits of turpentine, camphene, naphtha, and other liquid hydrocarbons obtained from coal oils answer this purpose. The soap is first dissolved in warm water; a paste is then prepared of flour, starch, dextrine, oat meal, or some similar substance, or of gelatine or glue, and this is added to give body to the composition. After thorough stirring and incorporation while hot, the spirits of turpentine, naphtha, camphene, or benzole is added, together with an equal quantity of saturated solution of carbonate of ammonia and  $\frac{1}{2}$  as much liquid ammonia. Perfumes are introduced to disguise the odor of the chemicals. —Soft soaps, as already mentioned, are prepared with potash instead of soda. They are of semi-fluid consistency, so that they may be turned from one vessel to another, and if boiled to excess do not harden, but become dry and scorched. They are generally of a dirty yellowish brown color, but when made with hempseed oil the color is greenish. Such is the *sapon vert*, a popular soft soap prepared in France, and so much esteemed that in order to imitate it the yellow of other ordinary soaps is sometimes converted to green by the introduction of indigo. The proportions of materials used in the factories of the United States for 450 lbs. of soft soap are 200 lbs. of oil and 72 lbs. of potash in lyes of specific gravity 1.110, equal to 22° Twaddell. In the ordinary domestic manufacture a lye of wood ashes has been commonly employed, thus converting to use the refuse ashes as well as the grease of the house; but wherever mineral fuel is used instead of wood, crude potash is purchased for the preparation of the lye. Soft soap always contains an excess of alkali, and the soap remains dissolved in the alkaline solution. It is consequently strongly detergent and well adapted for the coarser applications of the article. The water added may be allowed to remain, or it may be evaporated away till the mixture acquires the consistency of soft butter when poured upon a cold plate. The whole mixture, including the glycerine and any impurities present, may then be run off into vessels for cooling. —The soft soap thus prepared may be converted if desired into hard soap merely by adding a solution of common salt to the soap while it is in ebullition. The quantity of dry salt should be twice the weight of the oil employed, and the solution should be introduced into the boiling soap very gradually. The sodium of the salt takes the place of the potassium in the soap, and the latter uniting with the chlorine goes into the lye, which readily separates from the soda soap. In the domestic production of soft soap two methods are practised, one known as the cold, and the other as the hot process. By the former the melted fat is transferred to a cask and mixed with a hot solution of the alkali and stirred together, and more lye is added from time to time and stirred in till the process is completed.

The hot process differs from this merely in boiling the grease and lye over a fire till the combination takes place.—Substances are occasionally introduced into the hard soaps for the purpose of modifying their properties or as adulterants. Finely sifted sand is thoroughly incorporated with hard soaps to the extent of 7 or 8 per cent. for increasing their scouring properties; and with the same view the alkaline silicates, known as soluble glass (see SILICATES, SOLUBLE), prepared with soda for soda soaps, and with potash for the potash soaps, are stirred into the soaps, sulphuric or hydrochloric acid being first added, if found expedient to thus reduce the undue proportion of alkali which would be introduced with the soluble silica. Various methods of preparing and using the silicates for this purpose are in use. Common pipe clay is also added to soaps, and this like other adulterants, lime, gypsum, barites, steatite, and glue, may be detected by remaining undissolved when the soap is treated with alcohol. Starch is used to some extent as an adulterant in soap making. The following table presents the composition in 100 parts of some of the best known foreign soaps:

Variety of soap.	Fatty acids.	Dry potash.	Dry soda.	Water.	By whom analysed.
Castile soap (sp. gr. 1.0705).....	76.50	..	9.00	14.50	Ure.
Castile soap (sp. gr. 0.9669).....	75.20	..	10.50	14.30	"
Fine white toilet soap.....	75.00	..	9.00	16.00	"
Ordinary white soap, Glasgow.....	60.00	..	6.40	33.60	"
Mottled tallow soap of good quality kept for several years.....	81.25	1.77	8.55	8.48	Heeren.
Brown rosin soap, Glasgow.....	70.00	..	6.50	23.50	Ure.
London cocoanut oil soap, marine.....	22.00	..	4.50	73.50	"
French white soap.....	50.20	..	4.60	45.20	Thénard.
Marseilles marbled soap.....	64.00	..	6.00	80.00	D'Arcet.
Marseilles white soap.....	68.40	..	10.24	21.36	Braconnot.
Soft soap.....	44.00	9.50	..	46.50	Thénard.
London soft soap.....	45.00	8.50	..	46.50	Ure.
Belgian soft or green soap.....	36.00	7.00	..	57.00	"
Scotch soft soap.....	47.00	8.00	..	45.00	"
Semi-hard soap for fulling.....	62.00	11.50	..	26.50	Verviers.
Ordinary soft soap.....	42.80	9.10	..	48.00	Chevreul.

—As a medicine soap has long been employed for the sake of its laxative and antacid properties. In combination with rhubarb the astringency of this medicine is diminished, its tendency to become hard and insoluble prevented, and its purgative property increased; while acidity of the stomach is corrected by the decomposition of the soap and the release of its alkali. Dry carbonate of soda added to soap increases its alkaline effects. It is administered alone, either in solution or in the form of pills of 5 grains to a drachm in weight. The solution in water forms a convenient resort in cases of poisoning with the mineral acids, until the alkalies themselves can be obtained in stronger

form. It makes also an excellent enema for dissolving the hardened faeces in the rectum, for which purpose soft soap is used in strong solution. As an external application soap is much used in the form of liniments, cerates, plasters, &c., and a strong lather of soap is sometimes applied alone with great benefit to external injuries by rubbing; it also cures some forms of cutaneous disease, especially when the soap is combined with sulphuret of potash. It is again a convenient material for giving consistency to pills, such as contain no ingredients which the soap would decompose or counteract. Compounds called medicated soaps are prepared with Castile soap as a base by the introduction of antimony, iodine, croton oil, mercury, tar, turpentine, sulphur, &c. That called chlorinated soap is particularly valuable as a protection against contagion, when the clothes and hands and face are washed with it. To prepare it, one part of chloride of lime is incorporated with 11 parts of Castile soap, with the addition of some alcohol scented with oil of verbena. The mass is made into flat cakes and protected from the air in a wrapping of tin foil or gutta percha. This soap is powerfully detergent, and especially valuable for its efficiency in removing stains from fabrics. Arsenical soap, used by taxidermists for preserving the skins of birds and other animals, is prepared from 12 parts of carbonate of potash, 4 parts each of common white soap, air-slaked lime, and white arsenic, and one part of powdered camphor, with sufficient water to make a paste.—The soap manufacture is more largely carried on in Great Britain than in any other country. It is there concentrated among a limited number of very large establishments, the products of which amounted in 1852 to over 200,000,000 lbs., of which London and vicinity produced 54,000,000 lbs., Liverpool and vicinity 47,000,000, and Glasgow and vicinity 16,000,000. The annual revenue derived from heavy imposts upon the manufacture had amounted for several years previous to that period to more than £1,000,000. These restrictions were entirely removed in 1853. The product is almost wholly consumed for manufacturing and domestic purposes, the exportations in 1858, 1859, and 1860 varying from 160,000 to 190,000 lbs. The consumption for domestic uses alone has been estimated at over 8 pounds per annum for each person.—The history of soap is treated by Beckmann in his "History of Inventions;" its manufacture in Parnell's "Chemistry applied to the Arts," Knapp's "Chemical Technology," and in "A Treatise on Chemistry applied to the Manufacture of Soap and Candles," by Prof. Campbell Morfit (8vo., illustrated, Philadelphia, 1856). The French manufacture is described in one of the "Manuels Roret" entitled, *Nouveau manuel théorique et pratique du savonnier, ou l'art de faire toutes sortes de savons* (Paris, 1852).

SOAPSTONE. See STEATITE.

SOBIESKI. See JOHN III. SOBIESKI.

SOCIALISM, the name given to the philosophy or doctrine which teaches that the social relations of mankind are susceptible of a more precise, orderly, and harmonious arrangement than that which obtains in existing society. In all ages of the world, and in every civilized nation, there have been men who have attempted to devise or to put in practice new schemes of social life. They have seen the general poverty and distress to which the multitudes were subjected—the oppressions, the carnage, the frauds, the squalor, and the diseases which everywhere seemed the inseparable accompaniments of society; and, repulsed by the odious contemplation, they have inquired: What is the cause, and what is the remedy? It cannot be, they have argued, that nature intended the majority of men to continue always to exist in such a medium of ignorance and misery. It cannot be that the Divine Providence purposely brings to the banquet of life more persons than there are means to subsist. Everywhere there is enough created for the supply of all, enough for food, enough for clothing, enough for shelter and warmth; and yet everywhere the many are without food, or clothing, or shelter, or warmth. Nature is, then, without fault; Providence is beneficent and generous; but the modes which society has adopted for the distribution of the copious bounties of Heaven are deficient. The governments of the world, confining themselves to the organization of the mere political relations of men, leaving their social relations to shift for themselves, while they aggravate these evils often, are inadequate to provide a remedy. Nothing less than a new arrangement or construction of society, they maintain, is able to remedy the mischiefs which have their origin in its ill construction. As man was made to live in society, and cannot live without it, the great end of science should be to discover such a form of the social relations as will give to each person the fullest satisfaction of his wants, the most complete guaranty of his rights, and the amplest scope for the exercise of all his faculties, physical, intellectual, moral, and religious.—The projectors of new social systems may be divided into three classes: 1, the merely theoretical, who have sketched improvements or reforms of the social order, rather as an exercise of the imagination or reason than as plans for actual experiment; 2, the merely practical, who have withdrawn from the world to engage in small communities for common labors and common enjoyments; and 3, the theoretico-practical, or, if we may so designate them, the scientific, who have endeavored to combine an entirely new philosophy of social life, in an entirely new mechanism of social functions.—Of the first class, the great Greek speculator Plato was one of the earliest as well as one of the most remarkable. His work called the "Republic" was an elaborate though imaginary outline of his conception of a perfect state or society. Taking his stand upon his more

general philosophy of the soul, namely, that the necessities of the body, and the irascible and concupiscible passions, might be subjected to the supreme dominion of reason, he concluded that there might exist a community of men whose passions could be governed with moderation, and who, from knowing the evils that arise from ill conduct, might aspire to excellence and attain the perfection of the rational and moral powers. He explained with much judgment, acuteness, and eloquence the rise and revolutions of civil society; he anticipated some truths which Christianity has since made more clear to us; and there was not a little grandeur in his general conception, as well as a wonderful sagacity in the minutest details. But even Plato, with all his genius, could not escape from the influences of his time. He was a heathen, and bound by that inexorable notion of caste which fettered the polished and ingenious Greek nearly as much as it had done his Indian predecessors of the banks of the Ganges. Plato divided his society into 3 fixed classes, the magistrates, the warriors, and the laborers, or, as a critic has wittily said, into the shepherds, the dogs, and the sheep. This was but a reproduction of the Brahmins, the Kshatriyas, and the Soodras of an older time, and a new version of the doctrine of a race of gold, a race of silver, and a race of brass or iron.

Let he admitted two fundamental inconsistencies, a community of property, which must soon obliterate the distinctions of class, and a community of wives, which must soon obliterate all distinctions of person. Nevertheless his work abounds in noble and beautiful sentiments, and a profound instinct of justice and order pervades all its apparent exaggerations and errors. Toward the close of the middle ages Plato was imitated by an Italian monk, Tommaso Campanella, who among a multitude of other able works produced the *Civitas Solis*, seu *Idea Reipublicæ Philosophicæ*, which was a project for a universal spiritual and temporal monarchy, founded upon Christian principles, and designed to restore a perfect unity both to the church and state. He was accused of a scheme for engaging the Turks to assist him to secure possession of Calabria, where he contemplated reducing his system to practice; but a perusal of his writings shows rather that he chose this imaginative form of the "City of the Sun" as a convenient mode of promulgating his thoughts on philosophy and theology. He was one of the leading spirits of his age, who took an active part in its politics, and whose learning procured him among his ignorant contemporaries the reputation of sorcery, and the honor of banishment from his country. But a more conspicuous speculator in this line was the famous Sir Thomas More, lord chancellor of England in the time of Henry VIII. His treatise, called *Utopia*, has since given a name to projects deemed absurd and chimerical. It was composed in 1516 and printed clandestinely in Louvain; but a more exact copy was after-

ward published by Froben, the printer of Erasmus, at Basel, in 1518. The names of persons and places employed in it, such as Utopia (Gr. *οὐτοπια*, nowhere), Achorian (*αχωνη*, of no country), Amaurot (city; *αμαυρος*, dark or invisible), Anyder (river; *ανυδωρ*, waterless), &c., were intimations that the whole was meant to be unreal and fictitious. But in the invisible city, situated on a waterless river, in the land of nowhere, More contrived to discover a most animated and glorious commonwealth, in which there were no corrupt and tyrannical statesmen, only good citizens, and men and women who practised universally the virtues of justice and charity. In Utopia, farm houses were built over the whole country, to which the inhabitants were sent in rotation from the towns. Exchanges were effected without money. The chief business of the magistrates was to see that no one lived idly; all domestic labors were assigned to women; excesses of population were corrected by planting colonies, and irregularities of distribution by transferring the superfluous members of one township to the vacancies of another. In the midst of its generous arrangements, Utopia admitted of slavery, which was allowed not only as a punishment for crime, but to provide a class to perform the noisome, offensive, and more degrading functions of society. The more extravagant parts of the scheme, it is supposed, were introduced as a cover for other passages, in which the disorders of the existing society were attacked, thus enabling the writer, if accused, to treat his whole work as a mere sport of the fancy. In the same class as More's work, though less deserving of study, may be mentioned the *Oceana* of Harrington, the *Mundus Alter* of Hall, the *Salente* of Fénelon, the *Basiliade* of Morelly, the "Essay on Projects" of Defoe, and to a certain extent the "New Atlantis" of Bacon.—The earliest of the actual attempts at socialistic life that we read of was that of the Jewish sect known as the Essenes. Josephus and Philo both describe them, and there is some confirmation of their story in Pliny. The general purport of the Jewish historian's account is that they were a body of men who fled the cities and lived in villages, to escape the moral contagion of the former; that some occupied themselves in agriculture and others in trade; that they amassed neither gold nor silver, and made no acquisitions of property except to satisfy the common wants of life. They fabricated no arms, sedulously cultivated peace with all men, possessed no slaves, and were all free and equal to each other. Their main principles of morals were to love God, to love virtue, and to love all men. Their fidelity to these principles they evinced in their purity of life, their contempt of wealth, their habitual justice and charity, and their sedulous cultivation of the social affections. Marriage was not encouraged. No house or land belonged to any individual, but all possessions were for the common use. They formed but

one family, dwelt under the same roof, ate at the same table, engaged in the same worship. The sick and infirm were a common charge; old age was highly honored, and children carefully educated. Some modern writers, however, have doubted whether any such sect ever existed; among others, the ingenious essayist De Quincy, who enters into an elaborate and curious argument to show that the Essenes were only early Christians in a disguise assumed to escape the fires of persecution, which would else have withered the new faith before it had attained a secure foothold upon the earth. What would seem to confirm this view is the fact that the Gospels, which so frequently refer to other Jewish sects, as the Sadducees and the Pharisees, make no mention whatever of the Essenes, who, as characterized by Josephus and Philo, would have been the most peculiar and remarkable of them all. Similar to the Essenes in some respects were the modern Herrnhuters or Moravians of Germany, who in 1722 were founded by Count Zinzendorf. They were so far a community, as they adopted common rules and officers for the government of their societies, which separated themselves from the world; but they did not prescribe a community of property, and much less a community of wives. The men and women lived in separate tenements, and marriage was made the concern of the congregation; but these stricter usages in time were relaxed. The original society prospered exceedingly, and was enabled to plant colonies in many parts of the world. Their missionary labors have been the most systematic and most successful of any ever undertaken, and they have been universally regarded as peaceable, thrifty, and useful citizens. In the United States they have establishments in Pennsylvania, New York, and North Carolina, but their principal seat is at Bethlehem, Penn. As their earlier peculiarities have faded out, they are scarcely now to be distinguished from other people. The Shakers, a singular religious and industrial organization, now confined to the United States, have several large and flourishing communities, holding all their possessions in common. Marriage being strictly forbidden among them, their societies are recruited exclusively by accessions from without. (See SHAKERS.) Many other religious communities have been formed, such as the Agapemone of the Rev. H. Prince in England, and the Perfectionists at Oneida, N. Y., but they possess little or no value as socialistic experiments.—It is the third class of socialists, who profess to have given a scientific form to the doctrine, which is the most worthy of study and appreciation. St. Simon, of France, was the first of these who attracted attention, though not the first in the order of time or of merit. Early in life he was a soldier in the war of American independence, under Count Rochambeau; he then acquired a fortune in certain commercial speculations, and expended it in exhausting all the experiences that

modern civilized society could furnish. He gathered about him all the scientific men, and learned from them what they could teach; he plunged into the dissipations and debaucheries of fashionable life, giving balls, dinners, and festivals, to extend his knowledge of mankind; and finally, when his wealth had been scattered, he was abandoned to the most painful privations and miseries of a state of poverty. He was thus fitted, as he thought, by a trial of all the conditions of humanity, to become their exponent and their reformer. His plans of social regeneration dawned slowly upon him at the outset, but his thought grew with what it worked upon; and in the end he contrived what he denominated a new Christianity, or a scheme for the reconstruction of the religion, politics, industry, and social relations of mankind. To each man according to his capacity, to each capacity according to its works; such was the grand formula of the St. Simonian gospel. But the author did not live to witness its propagation. It was reserved for Rodrigues, Enfantin, Bazard, Cercelet, and Buchez to disseminate it over France. By their lectures and a journal established by them called *Le producteur*, it soon gained many disciples, and at one time threatened to absorb the best youthful mind of the nation. Many men, who have since attained distinction as statesmen and men of letters, took part in the famous expositions of the Rue Taranne, where the new school had its academy. But St. Simon had left his doctrine in the vague state of an aspiration or a sentiment rather than a system. His followers began to differ when they began to define. Sects arose in the bosom of the new faith. A common family was established in the Rue Monsigny, but the order of functions had not been arranged in a satisfactory way. An open quarrel between two of the chiefs, Enfantin and Bazard, led to other dissensions. The finances of the general association failed, and the police interfered with its meetings, which had become, in consequence of the vivacity of the discussions and the appearance of women on the tribune, more attractive than the theatre. Enfantin collected his friends again at a patrimonial estate which he held at Ménilmontant, where a multitude of laborers were organized into groups of industrials, artists, priests, &c.; but the experiment could not be made to pay, Enfantin was seized and imprisoned, and the new family gradually dispersed. Nevertheless, in spite of its want of practical success, the school of St. Simon exercised a powerful influence over the French mind, and is to this day represented in the journals, in the sciences, in the army, and in the departments of state.—Robert Owen, in England, was arousing the public mind to the necessity of a new order of society at the same time that St. Simon and his disciples were preaching in France. They proceeded, however, on wholly different grounds. St. Simon was a sentimentalist of profound religious sen-



sibilities, while Owen was a dry practical manufacturer, whose range of thought never expanded beyond the most strict and logical deductions of a material philosophy. Owen's fundamental axiom was that man was made entirely by his external circumstances, so that, to form his character, and to produce his entire happiness, nothing was requisite but a change in his external relations. Possessed of great wealth, he established a manufacturing colony at New Lanark, in which his principles were applied to the laboring classes. Justice in the payment of labor, vast domestic economies, and a thorough system of infant and adult education gave it for a time great and increasing prosperity. Statesmen and churchmen alike admitted the success of the attempt, and the system, or parts of the system, were in a fair way of being introduced into other manufacturing districts. But Owen was encouraged by the promise of his plans to step forth as a philosopher. He taught in pamphlets, speeches, letters, and books, his doctrine of the omnipotence of circumstances and of human irresponsibility, attacking at the same time all religions and all governments, and thus provoking the earnest hostility of the clergy as well as of politicians. Other establishments were subsequently erected at New Harmony and Orbiston, but they proved failures. His popularity declined rapidly, except among a portion of the laboring classes, and, though he lived to a ripe old age, incessantly laboring, among men of all ranks, and indeed in every civilized nation, to secure a reception for his schemes, he accomplished nothing beyond his earlier success. He had travelled over the world to indoctrinate it with his principles, but the world remained to the end of his life stubbornly incredulous.—A greater thinker than either St. Simon or Owen had all the while been maturing in obscurity at Paris a more stupendous and yet scientific socialism than had ever before been described. This was Charles Fourier, a man of singular penetration and comprehensiveness, and no less singular defects of mind. For the first time he studied the whole subject of social reorganization, not as a sentiment nor as a mere scheme of human amelioration, but as a science. He labored earnestly and thoroughly, and his zeal was rewarded in the many brilliant glimpses of a higher order of truth than the intellect had yet attained; but he also paid the penalty of his intellectual contempt for the labors of others, and of his impatience of results, by running into the strangest hallucinations and vagaries. Fourier saw very clearly, what his predecessors had not seen, that society was a growth, and not a construction; he saw that as it had followed fundamental laws of development in the past, so it must follow the same laws in the future; these laws, he also discerned, must be in analogy with the other laws of the living universe; and he concluded that the science of society must be the flower and consummation of all other sciences. But

not satisfied with these grand generalizations, and the practical applications to which they inevitably lead, he assumed the character of a universal social philosopher and legislator, and lost himself in magnificent *a priori* speculations as to the formation and propagation of worlds, and the future destinies of all humanity. His vigorous thought procured him many disciples in France, England, and the United States; many efforts have been made to reduce his more practical maxims to practice, but no signal or decisive result has anywhere been achieved. Socialism still remains an unsolved but by no means abandoned problem.—On the literature of socialism, see the works of the distinguished teachers we have enumerated, and particularly Charles Fourier, *Œuvres complètes* (5 vols., Paris, 1841); Victor Considérant, *Destinée sociale* (Paris, 1837); Pierre Leroux, *De l'humanité* (2 vols., Paris, 1840); Louis Blanc, *L'organisation du travail* (Paris, 1840), and other works; Louis Reybaud, *Études sur les réformateurs contemporains* (Brussels, 1841); Stein, *Geschichte der socialen Bewegung in Frankreich* (3 vols., Leipsic, 1850); Auguste Comte, *Traité de sociologie* (3 vols., Paris, 1852); Albert Brisbane, "Social Destiny of Man" (New York, 1840); and W. L. Sargent, "Social Reformers and their Schemes" (London, 1858).

SOCIETIES, LITERARY AND SCIENTIFIC. In the article ACADEMY an account is given of the learned societies which have adopted that designation, as well as a history of its origin. The term society, as applied to these associations of scholars or men of science, is nearly as ancient as academy. The "society of sixty" existed in the 4th century B. C. The "school or society of the poets," of which Martial often speaks in his "Epigrams," was a similar organization. In the middle ages there were several of these societies on the continent of Europe, among the most noticeable of which were the society of Caen, founded in the 11th century; the *confrérie du Puy* of Amiens, in the 14th century; the corporations of *Meistersängers* or "friends of the master-song" in many of the larger cities of Germany from the 14th to the 16th century; the "literary society or confraternity of the Rhine," in 1450; the *société des beaux esprits Allemands* at Hamburg, founded in the 17th century, &c. As a general rule the Romanic and Slavic nations of Europe have given to these organizations the title of academies, while the English, Teutonic, and Scandinavian nations have preferred the term societies. These societies may be classed under several heads. The "royal societies," of which that of London was the first, and is the type on which the others have been organized, have for their object the promotion of the physical and mathematical sciences, and their applications to the useful arts, and have suites of rooms, libraries, museums, &c., and publish annual or occasional volumes of "Transactions." Out of these have grown "associations for the promotion or advancement of science," which

have no library or museum, and no fixed habitation, but hold annual or semi-annual sessions of considerable duration, sitting in different cities, largely attended by men of science, devoting their attention to similar subjects with the royal societies, and publishing annual "Reports." After the royal societies sprung up societies for the cultivation of particular departments of physical science, such as the philosophical, botanical, chemical, geographical, geological, microscopical, mathematical, mineralogical, natural history, entomological, ornithological, zoological, and palæontological societies. Another class of societies are those for the promotion of the fine or the useful arts, comprising the societies of artists, or academies of arts, associations for promotion of the fine arts, art unions, and associations for promoting practical design, painting in water colors, architecture, music, engineering, &c. The medical, surgical, medico-botanical, Hunterian, Jennerian, Linnæan, Harveian, pharmaceutic, and apothecaries' societies may perhaps be ranked with these. All of these associations may be reckoned as pertaining to the arts and sciences. Next in order come those of a more mixed character, such as the literary and philosophical societies, some of which have cultivated with signal ability both literature and science; and the strictly literary societies, whose office is to investigate and develop the literature of different countries, such as the oriental, Asiatic, Celtic, and philological societies. The antiquarian societies, which are numerous in Great Britain and northern Europe, and of which there are several in the United States, form another class; and with them may be included societies devoted to particular departments of antiquarian research, such as the Parker society, for the publication of the works of the early English reformers; the Shakespeare society, for publishing old dramatic works; the Hakluyt society, for publishing early voyages; the Percy society, for collecting old ballad poetry; the motet society, for the revival of the ancient choral music of the church; the Sydenham society, for publishing old medical works; the Spalding club, the musical antiquarian society, &c. Intimately connected with these are the historical societies, which are numerous in the United States, and whose office it is to collect local historical documents, addresses, sermons, and such articles as will illustrate the early history of the state, county, or town which they represent. These associations usually have libraries, some of them large, and museums, and most of them publish volumes of "Transactions." Statistical societies, organizations having for their object the collection of tables of statistics on matters of education, commerce, population, pauperism, production, &c., are another class of somewhat recent origin, but of great importance; they usually publish a journal, monthly or quarterly. Agricultural and horticultural societies, though generally composed of too large

a mass of members to be very scientific in their character, may yet properly be reckoned among the scientific societies, having promoted great improvements in agriculture and horticulture, from the application of the principles of science to these subjects. The "Social Science Association," the latest of the British scientific organizations, having been founded in 1857, is, like the "British Association for the Promotion of Science," perambulatory; its objects are the improvement of reformatories, gaols, and convict prisons, the promotion of sanitary reform and education, and the simplification of legal processes.—Some of the societies referred to in this classification are worthy of special notice. The "Royal Society of London" was founded in 1645, by Dr. John Wallis, Dr. Wilkins of Wadham college, Drs. Goddard, Ent, and Glisson, and Messrs. Haak and Forster, who united in a club to communicate to each other the results of their researches in science and philosophy. It was not organized however in its present form till 1660, and was chartered in 1662 by Charles II., who bestowed upon it Chelsea college (afterward sold for £1,800). The number of resident fellows of the royal society is not limited; the number of foreign members may not exceed 50. A candidate for admission as fellow must be recommended by a certificate in writing, signed by 6 or more fellows, of whom 3 at least must certify that the recommendation is from personal knowledge; the name, qualifications, &c., of the candidate must be before the society during 5 ordinary meetings before a balloting can be had; and he cannot be elected if fewer than  $\frac{2}{3}$  of those present vote for him. He must appear for admission on or before the 4th ordinary meeting after his election, and before appearing must have paid the sum of £10 as admission money, and must also pay £4 annually as long as he continues a member of the society, unless he prefers to commute by a single payment of £60. Up to 1800 the society had published 90 volumes of "Transactions;" since that time it has issued one volume a year, so that the whole number of volumes at the present time (1861) is 151. The society has several foundations for gold and silver medals, and two lecture foundations, the "Bakerian" and "Croonian." There are few of the eminent scientific men of Great Britain of the last two centuries who have not been active members of the society. Among its presidents have been Sir Isaac Newton, Sir John Pringle, Sir Joseph Banks, Sir Humphry Davy, H. R. H. the duke of Sussex, the marquis of Northampton, and Major-Gen. E. Sabine, the present incumbent. It has a fine collection of portraits, a museum of great interest, and a large and valuable library. There are between 700 and 800 fellows. The "Society of Antiquaries," founded in 1707, and chartered in 1751, has a library and museum of antiquities. Its admission and annual fees are one half those of the royal society, and members are elected on the recommendation of 8 fellows. The

"Geological Society," founded in 1807, has a very extensive geological museum and a good library; its admission fee is 6 guineas, and annual subscription 3 guineas; the number of fellows is nearly 900. It publishes a quarterly journal. There are a number of societies bearing the title "Asiatic," both in Europe and the East. The earliest was the "Asiatic Society" founded by the Dutch in Batavia in 1780, and which prior to 1833 had published 15 volumes of transactions. In 1784 the "Royal Asiatic Society of Bengal" was founded by Sir William Jones at Calcutta, and has published its transactions as "Asiatic Researches," and afterward as the "Journal of the Royal Asiatic Society of Bengal." In 1823 the "Royal Asiatic Society of Great Britain and Ireland" was formed by Messrs. Colbrook, Ouseley, and others; since 1833 its transactions have been published in the society's quarterly journal. The "Oriental Translation Committee," founded in 1828, which has published versions in English, French, and Latin of many valuable oriental books, is connected with this society. The *Société Asiatique* of Paris, founded in 1822 by De Sacy, Rémusat, De Gerando, and others, has been very active. It has a museum, and holds an annual public meeting; it has published many oriental works, and a monthly journal from its organization. In St. Petersburg there is an oriental institution with oriental professorships and a museum. There are several German oriental societies. On the continent of Europe, some of the most distinguished literary and scientific societies are: the *Société philomathique de Paris*, founded in the latter part of the 18th century, and whose *Bulletin des sciences* has been issued since 1797; the *Société impériale des antiquaires de France*, which has published interesting memoirs on antiquities; the *Société de géographie de Paris*, which has published collections from time to time, and of late a geographical journal; the "Dutch Society of Sciences" (*Hollandische Maatschappij der Weetenschappen*), which has published its transactions since 1754; the "Batavian Society of Language and Poetry," transactions published in 1804 and subsequent years; the "Royal Botanical Society" of Bavaria; the "Society of Natural History" of Berlin; the "Royal Society of Sciences" of Göttingen, founded in 1751, which publishes a scientific periodical that was established before its foundation; and the "Royal Antiquarian Society" of Copenhagen, whose zealous investigations have thrown much light on the early discoveries of America.—In the United States there are but few scientific societies of the higher degree. Beside those named in the article ACADEMY, there are the "American Genealogical Society" of Boston; the "American Antiquarian Society" of Worcester; the "Geographical and Statistical Society" and the "New York Historical Society" of New York; the "American Oriental Society" of New Haven; the "American Philosophical Society" of Philadelphia; the

"American Ethnological Society" of New York; the "National Institution" of Washington; and the "American Association for the Advancement of Science." The principal natural history societies are the "Lyceum of Natural History" in New York, the "Boston Society of Natural History," the "American Academy of Natural Sciences" at Philadelphia, and several societies in the smaller cities. Historical societies have been organized in almost every state, and in many counties. The New York historical society, already named, has a neat classic building, a library of about 80,000 volumes, a gallery of valuable portraits, landscapes, &c., a considerable collection of statues, and an extensive and valuable museum, including the great collection of Egyptian antiquities of the late Dr. Abbott, and a series of sculptured marbles from Nineveh. It has published a number of volumes of transactions. The "Massachusetts Historical Society," founded in 1791, has also a respectable library and museum, and has published many volumes of transactions. The "Connecticut Historical Society" has a choice library of about 12,000 volumes, a large collection of antiquities and coins, and has published 8 volumes of transactions. The historical societies of Rhode Island, New Jersey, Pennsylvania, Maryland, and Ohio are all prosperous and have considerable libraries. There are few societies of special sciences in the United States. Medicine, pharmacy, geology, and chemistry are each represented by one or more, but these are mostly in a languishing state. There are several fine art associations, the membership of which is confined almost exclusively to practical artists; the most prominent of these is the "National Academy" in New York.

SOCIETY ISLANDS, a group in the S. Pacific ocean, under the protection of France, extending between lat. 16° and 18° S., and long. 148° and 155° W.; area, about 700 sq. m.; pop. about 15,000. The group is formed of two clusters of islands, one of which lies about 70 m. W. of the other. These clusters were formerly politically distinct, and distinguished by separate designations; but as the whole are now united under the French, it is no longer of any importance to preserve this distinction. Mariners usually speak of one cluster as the windward and the other as the leeward, applying the term Society islands to both combined. The Society islands, thus defined, exclusive of several islets which surround the others, are about 18 in number, viz.: Maitia, Tahiti or Otaheite, Eimeo, Maiaoiti, Tetuaroa, Huaheine, Raiatea, Otaha, Borabora, Marua, Tuba, Lord Howe's island, and Scilly island. The whole of the Society islands are mountainous in the interior, the highest peak, on the island of Tahiti, reaching an elevation of 8,500 feet above the sea, and have a border from 1 to 5 m. wide of rich level ground extending from the base of the high lands to the sea. In general appearance they all resemble each other, and lava, basalts, and pumice stone,

which are found in several places, indicate that, like all the other high land of the Pacific, their origin was volcanic. All these islands are surrounded by a belt of coral rock, of various width, situated from a few yards to perhaps 5 m. from the shore. The long rolling swell of the Pacific, caused by winds often blowing far to the S., is driven against these barriers, and breaks with terrific violence. Opposite every valley on the land there is generally a break or opening in the reef which allows the passage of the native canoes. Some of these passes are deep enough to admit vessels of the largest size, while inside them are everywhere found smooth water and good anchorage. There are several small lakes and lagoons in some of the islands, and all are watered by numerous streams, upon the banks of which, or along the shores, the inhabitants reside.—There is considerable variety of soil, the sides of the mountains being frequently covered with a thin layer of light earth; the summits of many of the hills have a thick stratum of red ochre or yellow marl, while the soil of the level tracts along the shores is a rich alluvial deposit, mixed with vegetable mould, and is exceedingly fertile. The climate is healthy and very mild, the range of the thermometer throughout the year being inconsiderable. Beside the breadfruit, these islands produce almost every tropical vegetable and fruit known in other parts of the world, together with some of less importance peculiar to the group. Many fruits and vegetables have been introduced from the temperate regions, but, with the exception of the orange, lime, and guava, they have not succeeded well. The guava shrub was brought from Norfolk island, where it had been naturalized, and has caused considerable change on the low lands. For miles the woodlands and bush are composed almost entirely of it, and it bears a profusion of large and delicious fruit, upon which pigs and cattle feed with great avidity. Garden produce, as known to us, is little cultivated, and exceedingly scarce and dear, and agriculture is not well attended to. Pigs, dogs, and rats were the only quadrupeds found upon the islands at the time of their discovery; but all our domestic animals have been introduced, and with the exception of the sheep and rabbit have thriven remarkably well. Horned cattle are abundant upon some of the islands. There are several varieties of birds on this group, and some of them are very numerous. There are numbers of aquatic fowl; the albatross, tropic birds, and petrel are found on all the islands; herons and wild ducks frequent the lakes and lagoons; and there are several kinds of birds of prey, woodpeckers, and small paroquets of rich and splendid plumage. Domestic fowl are abundant, and were upon the group at the time it was discovered.—The natives belong evidently to the Malay race, and are generally above the middle stature. Their countenances are open and prepossessing, though their features are

bold and sometimes prominent. Their complexion is olive or reddish brown, but there are great varieties of shades. The appearance of the men is vigorous and graceful, and their behavior affable and courteous. In their dispositions they seem to be candid; have a great deal of curiosity, ingenuity, and imitation; and are found to possess very creditable mental capabilities. The custom of tattooing their bodies is now rarely practised. The native costume has been altogether abandoned for dresses bearing some resemblance to those worn by civilized nations. Shoes and stockings are rarely worn, and many have no covering to the head. The children go entirely naked till they are 3 or 4 years old, and are remarkably healthy and active.—The native manufactures have been entirely superseded by imported goods. The commerce of the Society islands is trifling. The chief intercourse is carried on with Valparaiso, Sydney, and San Francisco, and the domestic exports of the group consist principally of oranges, small quantities of cocoanut oil, and arrowroot. During the first 7 months of 1860, 75 vessels, of an aggregate of 6,945 tons, arrived at Tahiti, and 85 sailed, of an aggregate of 8,210 tons. The value of the imports was \$397,667, and of the exports \$324,958, of which only \$62,813 worth was domestic produce. There are only a few ports throughout the group at which foreign vessels are permitted to anchor, and many obstacles are thrown in the way of traders.—The Spaniards lay claim to the discovery of Tahiti, the chief island of this group, so early as 1606; but it is generally supposed that their discovery did not belong to the Society islands. Capt. Wallis, in a British ship sent to make discoveries in the South sea, reached Tahiti in 1767, and named it King George's island. Bougainville touched at it the year following; and Capt. Cook reached it in 1769. During Cook's stay at Tahiti he discovered most of the islands in the N. W. cluster, and gave to the whole group the name of Society islands, in honor of the royal society of London. The Spaniards attempted to colonize Tahiti in 1772-'4; and about that date Cook visited the group a second time, and again on his last voyage in 1777, when he found a house and the cross, which the Spaniards had erected, carefully preserved by the natives. After this 11 years passed without any communication between the Society islands and the rest of the world, when the Bounty arrived to transport plants of the breadfruit tree to the British West India islands. All these voyages excited great interest in England, and the result was the formation of the London missionary society, which fitted out a ship to carry missionaries into the islands of the Pacific. This vessel arrived at Tahiti early in 1797. For 19 years the labors of the missionaries were fruitless, and they were even treated with contempt, till Pomare II. embraced Christianity in 1816. Pomare died in 1821, and during the minority of his son

the missionaries acquired great influence; but the son having died before he attained manhood, he was succeeded by the present queen Aimata or Pomare, the latter being the surname of the reigning family. From the conversion of Pomare II. the power of the missionaries continued increasing, till about 20 years ago it became all but paramount at Tahiti. The success of the French Catholic missions on the islands to the E. induced two priests and another individual to come to Tahiti in order to establish their faith in the Society islands. The English missionaries fiercely opposed this, and the 3 persons were forcibly deported. This step drew down the vengeance of the French government, and a frigate was sent to demand liberty for all French subjects, and \$2,000 as the expenses of the voyage to France of the expelled missionaries. After various controversies, and the arrival of a powerful fleet, a strong force landed on Tahiti in 1844, and hauled down Pomare's standard and hoisted the French flag, taking possession in the name of Louis Philippe. The queen made her escape to a neighboring island, and several skirmishes afterward took place between the natives and the invaders; but in a few weeks the French power was completely established in Tahiti. Pomare was recalled from her retreat, and a treaty entered into, by which she was restored to authority, and the whole of her dominions placed under the protection of France. In reality this protection is but a name, and the French power is as absolute in the Society islands as in any other part of the empire. Capt. Cook, from the crowds which collected on the coast, supposed the population of Tahiti to be 80,000; but the first missionaries estimated it, along with that of the neighboring island of Eimeo, at 10,000 souls. The entire population of these two islands is now only about 2,000,  $\frac{1}{2}$  having been cut off by venereal disease, small pox, measles, and rum. The social condition of this remnant is improved by the labors of the missionaries, but their moral conduct is still very irregular.

SOCINUS, LÆLIUS, an Italian theological writer of the noble house of the Sozzini, born in Sienna in 1525, died in Zürich, March 16, 1562. The studies in theology to which his tastes inclined him early led him to doubt some of the fundamental doctrines of the popular creed, especially the doctrine of the Trinity. The inconvenience to which he was subjected by the profession of sceptical opinions, and a desire to know personally the leading reformers, led him, after various travels, to a residence first in Switzerland, then in Germany, and finally in Poland, where he found many persons who were in sympathy with his views. In Wittenberg he gained the friendship of Melancthon; and in Geneva not only had an adviser in Calvin, but was warmly recommended by the Swiss reformer to Prince Radziwill of Poland. This favor of the reformers was withdrawn when his peculiar doctrines were dis-

covered. His last abode was at Zürich in Switzerland. He was an accomplished scholar in the oriental tongues, an acute critic of the Scriptures, an able disputant, and fearless in his spirit of inquiry. His property and his MSS. were bequeathed to his nephew.—FAUSTUS, nephew of the preceding, born in Sienna in Dec. 1539, died near Cracow in the latter part of 1604. He had by his sceptical spirit early made himself obnoxious to the authorities of the church, and was at the age of 20 compelled to seek safety abroad. While residing at Lyons he learned the death of his uncle, and went to Zürich to secure his inheritance, with which he returned to Italy. Finding a patron in Francesco de' Medici, grand duke of Tuscany, he was for 12 years an attendant upon the luxurious court of Florence, sharing in its dissipation. At last, weary of this useless life, he resolved to be a religious reformer, and to propagate those opinions of his uncle which he had learned to regard as the essence of saving truth. In 1574 he took up his residence at Basel, and busied himself in elaborating into a system the scattered hints and views in the writings of Lælius. Three years later he appeared in open debate, maintaining that the Trinity was a pagan doctrine, and that Christ was a created and inferior being. This boldness, while it made him unpopular with the Swiss church, gave him fame abroad. He was called to Transylvania (where the eloquent physician Blandrata had already established many Unitarian churches), to use his influence in opposition to Davidis, who had taken the extreme ground that all worship paid to Christ was needless and idolatrous. His efforts here being unsuccessful, he passed into Poland, where the Anti-Trinitarian party had already gained a strong foothold. But his moderate opinions made him here unpopular, and he was coldly received. After 4 years of residence in Cracow, embittered by suspicion, reproach, and persecution, his marriage with the daughter of a nobleman in the neighborhood seemed to revive his hope and give him new influence. He found by this a comfortable home, and made proselytes from the noble and wealthy classes. But the death of his wife and her father deprived him of his place of retreat; sickness came to prostrate his mind and body; his lands in Italy were confiscated, and his income from that source cut off; at one time he was assailed by a mob, dragged into the street from a sick bed, and exposed in the market place; his furniture was broken and his MSS. were destroyed; and when, at the close of the year 1604, death came to him in a small village near Cracow, he welcomed it as a relief from misery. Through the daughter that survived him, Faustus Socinus is the ancestor of many of the most eminent families in Poland. His works, contained in the first two volumes of the *Fratres Poloni*, consist of theological tracts, expositions of Scripture, and polemical treatises, with a great number of letters. Many

of his unpublished letters are in the library of Sienna.—Though Socinus was the founder of a school in theology, his influence was rather negative than positive, and his fame came from what he denied more than from what he asserted. He denied the Trinity, the deity of Christ, the personality of the devil, the native and total depravity of man, the vicarious atonement, and the eternity of punishment. His theory was that Christ was a man divinely commissioned, who had no existence before he was conceived by the Virgin Mary; that human sin was the imitation of Adam's sin, and that human salvation was the imitation and adoption of Christ's virtue; that the Bible was to be interpreted by human reason, and that its metaphors were not to be taken literally. He professed great reverence for the Scriptures both of the Old and New Testaments, and for Christ as the messenger of the Father sent to reconcile man to God. The personal morality of Faustus Socinus was pure, and no serious charge was made against his character as a man. His learning was less extensive than that of his uncle, yet he was expert in the original tongues of the Bible and well acquainted with the works of the Christian fathers.—The name Socinian, which is often given to those who hold Unitarian opinions as a term of reproach, was for a century the honorable designation of a powerful and numerous religious body in Poland, Hungary, and Transylvania. It was only the union of the secular and ecclesiastical force that succeeded in breaking up and dispersing the Socinian party in Poland; and the Racovian catechism, compiled mainly from the writings of Socinus, is still the text book of faith and worship in many Hungarian and Transylvanian churches. The opinions of Socinus are professed still by churches in Holland, Switzerland, Great Britain, and the United States.—The life of Lælius Socinus was written in Latin by Christian F. Ilgen (8vo., Leipzig, 1814), who also published in 1826 2 parts of another work in quarto, entitled *Symbolum ad Vitam et Doctrinam Lælii Socini illustrandum*. The life of Faustus Socinus was written by the Pole Przypkovich, and by the Rev. Joshua Toulmin (8vo., London, 1777). His works are collected in the first two volumes of the *Bibliotheca Fratrum Polonorum*.

**SOCK** (Lat. *soccus*), a kind of low shoe or slipper without fastenings, worn by Roman comic actors, and hence metaphorically applied to comedy itself, as in the expression "Jonson's learned sock."

**SOCONUSCO**, a Mexican province, dependent on the state of Chiapas, lying on the Pacific ocean, between lat. 15° and 16° N., and long. 92° 30' and 93° 30' W.; area about 2,400 sq. m. Its population is small, probably not exceeding 20,000. It is very fertile, and celebrated for its cacao. Under the Spanish rule the entire crop was a monopoly of the crown, and taken to Spain. The province is without good ports, and has a very

limited commerce, its trade being chiefly confined to an exchange of cacao for other commodities with the neighboring departments of Guatemala.—Soconusco formerly belonged to the captain-generalcy of Guatemala, and was embraced in the republic of Central America. During the political troubles of the republic it was occupied by a Mexican force, and its possession afterward became a subject of dispute between Mexico and Guatemala, until 1856, when the latter relinquished its pretensions to sovereignty for a pecuniary consideration.

**SOCORRO**, a central co. of New Mexico, bounded E. by Texas, S. in part by the Rio Gila, separating it from Arizona, and W. by the Colorado, separating it from California, and intersected by the Rio Verde, Rio Grande del Norte, and Rio Pecos; area, over 80,000 sq. m.; pop. in 1860, 5,787. There are numerous fertile valleys along the streams, but the greater part of the county is mountainous and unproductive. It is traversed by the Sierra Madre and other mountain ranges. Gold, iron, and other minerals are found. Capital, Socorro.

**SOCOTRA**, an island in the Indian ocean, belonging to the imam of Muscat, about 150 m. E. N.E. from Cape Guardafui, the eastern extremity of Africa; length about 70 m., breadth 23 m.; area estimated at 1,000 sq. m.; pop. about 4,000. Tamarinda, the capital, is situated in lat. 12° 39' N., long. 54° 1' E. The surface is generally elevated about 800 feet above the sea, and the shores are bold. Toward the N. there is a ridge of mountains with several peaks rising to the height of 5,000 feet. There are some small streams, and where there is sufficient moisture vegetation is remarkably luxuriant. Date trees and cotton are cultivated; but the productions for which Socotra is particularly famous are aloes and the gum of the dragon's blood tree, both of which are said to be the finest in the world. Camels, horned cattle, sheep, asses, and goats are reared. There is some trade carried on with Muscat.

**SOCRATES**, a Greek philosopher, born in Athens in 469, died there in 399 B. C. The son of Sophroniscus, a sculptor, and of Phænarete, a midwife, he was of humble rank and always poor. He was trained in his father's art, and tradition ascribed to his chisel 8 draped figures of the Graces which in the time of Pausanias were shown on the acropolis. There is no authoritative indication of his skill in sculpture, of the time when he abandoned this art for the profession of public teacher, nor of his antecedent studies. Of the ancient statements that he was a disciple of Anaxagoras or of Archelaus, the first is disproved, and the second is improbable. He called himself self-taught, and referred his knowledge sometimes to books, but more frequently to intercourse with distinguished men in that culminating period of Athenian patriotism and culture. Though traditionally represented as an old, bald-headed man, it is probable that his extraordinary peculiarities were early manifested, and it is certain that he

was famous both among wits and the populace in 428, when the "Clouds" of Aristophanes was first exhibited. Plato, Xenophon, and Aristophanes offer different phases and estimates of his philosophy, but agree in the outline of his personal qualities and habits. With remarkable physical strength and endurance, he trained himself to coarse fare, scanty clothing, bare feet, and indifference to heat or cold, aiming thus to reduce the number of his wants, as a distant approach to the perfection of the gods, who want nothing. With flat nose, thick lips, prominent eyes, bald pate, squat figure, and ungainly gait, he wandered about the streets of Athens, standing motionless for hours in meditation, and charming all classes and ages by his conversation, so that Alcibiades (in Plato's *Symposium*) likened him to an uncouthly sculptured Silenus containing within the images of the gods, and declared that "as he talks, the hearts of all who hear leap up and their tears are poured out." With naturally impetuous appetites, of an irascible temper, he has yet been called the most illustrious example in history of the moral conscience, and the creator of moral science; but, though a sage and a martyr, he was wholly removed from the gloom and constraint of asceticism, exemplified the finest Athenian social culture, was a witty as well as serious disputant, and on festive occasions would drink more wine than any other guest without being overcome. Few events of his life are recorded. Of his wife Xantippe, all that has passed into history is that she bore him 8 sons, that she had a most violent temper, and that he married and endured her for self-discipline. He was an enthusiastic lover of the city, within which alone he found instruction, and beyond the walls of which he never went, except once to a public festival, and again to serve as hoplite at the battle of Potidæa, on the outbreak of the Peloponnesian struggle, and at Delium and Amphipolis (424 B. C.). At Potidæa he went barefoot over ice and snow, surpassed all other soldiers first in the cheerful endurance of hunger and then in the apparent enjoyment of plenty, and saved the life of Alcibiades, to whom, instead of himself, his own request caused the prize of valor to be awarded. His composure and bravery were alike distinguished at Delium and Amphipolis. He sought influence neither as a general nor statesman, and once only discharged a political office. In 406 he was one of the 5 prytanes of the senate, when the illegal sentence of death was proposed against the victors of Arginusæ; and he alone obstinately persisted in his protest, despite the menaces of the people and the assembly, so that the remaining prytanes were obliged to put the question without his concurrence. He soon after had occasion to show that he could defy tyrants as well as the populace. He was summoned by the Thirty, with 4 other citizens, to proceed to Salamis and bring back Leon to punishment; and he again alone refused, while the others obeyed

the order. Engaged as a missionary in the service of philosophy, he was warned from participating in public affairs by an internal voice, an authoritative Mentor, a divine oracle, which he professed to hear from childhood in the way of restraint, but never in the way of instigation, and which he was accustomed to speak of familiarly and to obey implicitly. This demon or genius of Socrates, which was not personified by himself, was regarded by Plutarch as an intermediate being between gods and men, by the fathers of the church as a devil, by Le Clerc as one of the fallen angels, by Ficino and Dacier as a good angel, and by later writers as a personification of conscience, or practical instinct, or individual tact. Nor was this the only way in which he received the special mandates of the gods. By divinations, dreams, and oracular intimations, he believed his peculiar mission to be imposed upon him; and when the Pythian priestess pronounced him to be the wisest of men, he was perplexed between the decision of an authority which he deemed infallible and his own estimate that he had no wisdom whatsoever on any subject. With this divine sanction, he struck out the original path of an indiscriminate public talker for the sake of instruction. His disinterestedness, poverty, temperance, easy affability, and unrivalled sagacity, as well as his plausible and captivating voice and manner, commended his conversation. He spent the whole day in public, in the walks, the gymnasia, the schools, the porticos, the workshops, the market place at the hour when it was most crowded, talking with every one without distinction of age, sex, rank, or condition, discussing with politicians, sophists, military men, artists, and ambitious youths, eager to get self-knowledge and to awaken the moral consciousness, striving to win now Alcibiades and now Theodota to virtue, never accepting money in return for wisdom, attracting listeners during his later years even from the remoter cities of Greece, but founding no school, teaching in no fixed place, and writing no books. His custom was by systematic cross examination to convict every distinguished man whom he met of ignorance. Thus, after hearing the oracular eulogy from Delphi, as reported by Plato in his "Apology," he set out to examine the men whom he deemed wiser than himself. The politicians, the poets, and the artificers were in turn affronted as he attempted to demonstrate their conceit of knowledge without its reality, their skill without wisdom. His irony, or assumption of the character of an ignorant learner, till he involved his opponent in contradictory answers, added zest to his discussions among the naturally dialectic Greeks. But he differed from the sophists, though he was ridiculed as the chief of them, in that, whether serious or humorous, he was ever seeking a positive basis for truth, while they for the most part denied the possibility of truth, and could ply the sophistical art with entire indifference to it. In his conception, virtue was as intellec-



tual as vice, and he let slip no opportunity to engage with the masters of sophistry, to follow them through their subtleties, to unravel their captious inquiries, and to wield the weapons of rhetorical adroitness in the interest of truth. Moreover, while he exerted a commanding influence among young men, he exhibited undisguised contempt for the rulers, proclaiming that government was a most difficult science, and that men, who would not trust themselves in a ship without an experienced pilot, not only trusted themselves in a state with untried rulers, but even sought to become rulers themselves. He thus made the formidable enmities to which he fell a victim. Attached to none of the political parties, ridiculed in turn as a buffoon and as a moral corrupter, at once the butt of the wit of Aristophanes and the special object of the hate of the Thirty, especially odious from his intimate connection with Critias and Alcibiades, only a pretext was wanted to bring upon him all the vengeance of power. This pretext was found in a charge of impiety. Grote affirms that Athens was the only city in the ancient world where a cross-examining missionary could so long have exercised his calling with safety and impunity, and therefore extols the intellectual inquisitiveness and freedom of the age. But at length an orator named Lycon and a poet named Meletus united with the demagogue Anytus in impeaching him for despising the tutelary national gods, for introducing another new divinity, and also for corrupting the youth. The charges were a pretence to gratify private spite, which however was sure of a wide sympathy. The details of the accusers were that he worshipped a demon unknown to the mythology, that he contemned the existing political constitution by ridiculing the practice of choosing archons by lot, that he taught young men the habit of depreciating the entire mode of life of their fathers, and that he quoted and perverted passages from the poems of Homer and Hesiod to favor aristocratic doctrines. He approached his trial with no expectation of acquittal, though he had always obeyed the laws, and even in religious opinions was identified with the public mind of Athens. He commented upon all the imputations, and denied some. He mentioned his blameless life, his divine commission, and the consequent antipathies which he aroused, refuted the charge of irreligion, maintained a calm, brave, and rather haughty bearing, and declared his solicitude rather for the good repute of the Athenians than for himself. He heard without surprise the sentence of condemnation, and was astonished that the verdict was passed by a majority of only 5 or 6 in the Athenian dicastery of 567 members. It is probable that the prosecution was designed rather to humble than to destroy the aristocratic philosopher; Xenophon affirms that the defiant and fearless tone of his defence was the direct cause of his condemnation; and it is certain that the capital sentence which followed it was the consequence

of his disdainful demeanor. The penalty of death having been pronounced, he declared himself satisfied both with his own conduct and with the result, calculated that his bearing on the trial would be the most emphatic lesson which he could read to the youth of Athens, and predicted that his removal would be the signal for numerous apostolic successors. An interval of 80 days was allowed for the annual Theoric mission of the sacred ship to Delos, which he passed in prison, with chains on his legs, in conversation with his friends. The Platonic dialogues of "Crito" and "Phædo" are probably imitations or developments of his last arguments on the duty of obedience to the laws and on the grounds of immortality. His address to his friends, before drinking the fatal hemlock, closes thus: "It is now time that we depart, I to die, you to live; but which has the better destiny is unknown to all except the gods." The closing words of "Phædo" are: "Thus died the man, who, of all with whom we were acquainted, was in death the noblest, in life the wisest and most just." Hegel regards his death as the tragedy of Athens, the result of a collision between the established oligarchy and the aristocracy of talent; between two opposite social tendencies, the one representing the old Greek unreflecting morality, and the other the later spirit of freedom, subjectivity, and conscious personality. There is no authority but that of Plutarch for the statement that the Athenians afterward lamented his fate and punished his accusers.—The *Memoabilia* of Xenophon and the dialogues of Plato have been supposed to represent an exoteric and an esoteric Socrates, and it has been a long controversy which contains the most complete and true history. The former professes to record actual conversations held by him, and was designed as an apology; while the Socrates of the latter is the spokesman of theories, which may or may not have been the opinions of the master as well as the disciple. But the two pictures thus presented are in the main accordant, the former giving prominence to the practical and the latter to the speculative side of his philosophy, and each supplying the defects of the other. The Xenophontic hero is a religious and philanthropic preceptor; the Platonic hero is a philosopher and dialectician; but both agree in the topics of discussion, which are human, not physical or divine, in their dialectic method, and in their general ethical tendency.—Socrates marks the epoch in Greek philosophy when speculation turned from physics to ethics. The problem of the cosmos, solved by imaginary theories, had been the burden both of the Eleatic and the Ionic schools. During the prevalence of the sophistic art all the reigning contradictory hypotheses were discovered to be alike groundless and fantastic. The subject seemed to Socrates in impenetrable confusion, and despairing of compassing it until some fundamental reform, he declared the secrets of nature to be beyond the

limits of attainable science. Forsaking as hopeless the problem which had occupied his predecessors for two centuries, he directed his attention to human relations, duties, and passions, to the realities of Athenian life. Astronomy he pronounced a divine mystery, geometry he valued only for land-measuring, general physics he discarded altogether as having furnished and promising nothing but hypothetical, contrary, and useless results; human practice alone, with the knowledge pertaining to it, was esteemed the proper subject of human investigation. This innovation was important, not for what it excluded, but for the new phenomena which it admitted into the circle of scientific inquiry. Philosophy was brought down from the heavens to the earth; the light of speculation was thrown upon "whatever of good and evil has befallen you in your house;" the problem of man and nature was divided; and human dispositions and ends became a separate science. While his aim was thus ethical, his method marks the commencement of analysis. To him Aristotle assigns two novelties, inductive discourses and the definitions of general terms. "It may be doubted," says Grote, "whether any one before him ever used the words genus and species, originally meaning family and form, in the philosophical sense now exclusively appropriated to them. Not one of those many names, called by logicians names of the second intention, which imply distinct attention to various parts of the logical process, and enable us to consider and criticize it in detail, then existed. All of them grew out of the schools of Plato, Aristotle, and the subsequent philosophers, so that we can thus trace them in their beginning to the common root and father, Socrates." Men had always reasoned and argued, but without analytical consciousness, grouping their ideas with reference rather to rhetorical effect or emotional results than to scientific generalization or demonstration. Socrates was the first to consciously apply the essential features of formal logic, treating each of the familiar words designating moral attributes as logical aggregates, distributing under them our judgments in particular cases, scrutinizing the dialectic process, and by cross-examining and methodized discussion seeking to systematize our knowledge and to attain the law of life. The main problem of his philosophy was the nature of virtue, and his fundamental doctrine was that virtue is intellectual, a necessary consequence of knowledge, while vice is ignorance, and akin to madness. That a man should know the good, and yet not do it, seemed to him a logical impossibility. Knowledge, virtue, and happiness he held to be inseparable. He proposed well-doing as the noblest human pursuit, but he took into view only the intellectual conditions thereof. His ultimate view of human life was severely practical, and urged good conduct with rational purpose in whatever special profession or trade as the highest duty. His religious

doctrines culminated in the conception of the Deity as the author of the harmony of nature and the laws of morals, revealed only in his works, and of the soul as a divine and immortal being, resembling the Deity in respect of reason and invisible energy.—The most complete discussions concerning Socrates are in general histories of Greece and of philosophy. See also Wiggers, *Sokrates als Mensch, Bürger und Philosoph* (1811); Schleiermacher, *Ueber den Werth des Sokrates als Philosophen* (1814-'15); Nares, "An Essay on the Demon or Divination of Socrates" (1782); Lelut, *Du démon de Socrate* (1856); and Bendixen, *Ueber den tiefern Schriftseinn des revolutionären Sokrates und der gesetzlichen Athener* (1839).

SODA, the oxide of sodium, NaO; chemical equivalent 81; specific gravity 2.805. It is obtained free from water by burning sodium at a high temperature, or by treating 23 parts (one atom) of sodium with 40 parts (one atom) of hydrate of soda. It is a grayish white solid, fusing at a red heat, volatile with difficulty, and having an intense affinity for water, with which it combines with great evolution of heat. It combines with acids with great energy, though its affinities are somewhat weaker than those of potash. Its salts are all colorless, unless the acid itself is colored, are nearly all readily soluble in water, and are more disposed than those of potash to unite with a large quantity of water of crystallization and become efflorescent. The only reagent which is generally available for distinguishing its salts from those of the other alkalies is a solution of antimoniate of potash, which gives a white precipitate even in dilute solutions. Another excellent test, as noticed below, is the periodate of potash. When soda salts are heated in the blowpipe flame, or when alcohol containing them is burned, the flame has a strong yellow color, not destroyed even when these are mixed with 20 or 30 times their weight of potash salts. Soda salts of nearly every inorganic and of most of the organic acids are known; and there also exist many double salts, with the oxides of nearly all the metals.—Hydrated or caustic soda (NaO HO) is a white, brittle substance, fusible below redness, containing 22.4 per cent. of water. It is obtained by decomposing a solution of carbonate of soda by lime, decanting the solution, and evaporating to dryness, or by treating a solution of sulphate of soda with baryta water, and evaporating the solution. The manufacture as conducted on a large scale will be described with that of the carbonate. The following table shows the percentage of anhydrous soda in solutions of given specific gravities. A solution saturated at common temperatures contains 36.8 per cent.

Specific gravity.	Per cent.	Specific gravity.	Per cent.	Specific grav.	Per cent.	Specific grav.	Per cent.
2.00	77.80	1.56	41.20	1.40	29.00	1.23	16.00
1.85	63.60	1.50	36.50	1.36	26.00	1.15	13.00
1.73	53.80	1.47	34.00	1.32	23.00	1.12	9.00
1.63	46.60	1.44	31.00	1.29	19.00	1.05	4.70

The salts of soda are so numerous, that only those abundant in nature or used in the arts or manufactures can be considered here. The nitrate, or cubic nitre, is described in the article NITRATES; the sulphate in GLAUBER'S SALT; the hyposulphite in HYPOSULPHITES; the biborate in BORACIC ACID, and BORAX. Three interesting double sulphates of soda and alumina (soda alum), of soda and lime (glauberite), and of soda and magnesia, occur as minerals. Soda also forms a bisulphate. The sulphite of soda is now largely employed to remove the last traces of chlorine from woven goods, thread, or paper pulp after bleaching, and thence derives the name of antichlore. A very minute quantity is sometimes added to white wines, when bottled, to prevent them from darkening. It is also used to impede fermentation in the manufacture of beet root sugar. It is prepared by passing a current of sulphurous acid gas, produced by the burning of sulphur, over the surface of moistened crystals of carbonate of soda, contained in chambers so arranged as to present a very large surface. The periodate of soda is remarkable for its insolubility, and this circumstance is the foundation of one of the best direct tests for soda, by the addition of a concentrated solution of periodate of potash to solutions containing soda salts, when the periodate precipitates. The neutral phosphate of soda is employed in medicine as a laxative. It also occurs in considerable quantity in several of the animal secretions, especially the urine. The double phosphate of soda and ammonia is employed as a blowpipe reagent. It is known as microcosmic salt, and is found in considerable quantity in urine. Tungstate of soda, which is obtained to some extent in Cornwall, as a product of the treatment of tin ores containing wolfram, is employed as a mordant for dyeing purposes, and for the manufacture of the tungstates of lime, barytes, and lead, to be used as pigments; and a solution has recently been found to be the best substance for rendering ladies' dresses non-inflammable. (See INCOMBUSTIBLE CLOTH.) The stannate of soda is a valuable mordant in calico printing. It has hitherto been prepared by heating a mixture of caustic soda, common salt, and nitrate of soda, with metallic tin, in an iron crucible; but the recent process of Mr. James Young avoids the necessity of first reducing metallic tin from the ore and afterward oxidating it again at the expense of the nitrate of soda, by taking the native peroxide, and fusing it directly with caustic soda. The iron and other foreign metals are insoluble in the alkali, so that by dissolving the fused mass in water, a nearly pure stannate is obtained at once. The sulpho-antimoniate of soda (Schlippe's salt) is used in medicine. The silicates of soda comprise a large number of minerals, of which the most important are albite or soda feldspar, which is a silicate of soda and alumina; labradorite, andesine, and oligoclase, which all contain lime and alumina; nepheline, cancrinite, hauyne, sodalite, and lapis lazuli.

Window and plate glass are principally composed of silicate of soda, and bottle glass generally contains much soda, though lime commonly preponderates. Soluble or water glass, which is a silicate containing a large excess of soda or potash, is described in SILICATES, SOLUBLE.—The most important salts of soda are the carbonates, of which there are three, the monocarbonate ( $\text{NaO CO}_2$ ), the bicarbonate ( $\text{NaO } 2\text{CO}_2$ ), and the sesquicarbonate ( $2\text{NaO } 3\text{CO}_2$ ). All these combine with various proportions of water to form hydrates. The first named, which is by far the most important, and is generally known as soda, commonly combines with 10 equivalents or  $1\frac{1}{2}$  times its weight of water. It is used to an enormous extent in the manufacture of glass and soap, also in some operations of bleaching and dyeing, and in many other chemical operations. It occurs native, forming incrustations in many countries. It was formerly derived almost entirely from the ashes of plants growing on the sea shore and of sea weeds. (See ALGÆ, BARILLA, FUCUS, and KELP.) Barilla, the crude soda, is still exported from Spain and Sicily to England, the United States, and other countries, but is for the most part superseded by artificial soda. The difficulty of obtaining a supply of soda in France during the wars of the last century, led the French government to offer a reward for a process of making it which would be commercially practicable. That proposed by Leblanc was adopted, and is now generally used wherever soda is made. It consists, first, in treating sea salt with sulphuric acid, thus converting it into sulphate of soda, hydrochloric acid being given off; second, in heating in a reverberatory furnace a mixture of 400 parts of dry sulphate of soda, 400 parts of dried chalk, and about 140 parts of coal. This mixture is raked occasionally with an iron scraper; it softens at a red heat, giving off a large quantity of carbonic oxide, which burns with a blue flame. The product is known as black balls or ball soda, consisting principally of carbonate of soda, caustic soda, and oxysulphate of lime, with often a good deal of undecomposed chalk, the proportion of carbonate and caustic soda being generally about 35 per cent. if the operation has been well conducted. Much is sold in this state. When this is dissolved and the solution evaporated to dryness, the product is known as sal soda. When greater purity is desired, the solution is crystallized, and when this is twice repeated a very pure article is obtained. If the solution is treated with milk of lime, a solution of caustic soda is produced. If this is concentrated, mixed with oxide of iron rather exceeding in weight the amount of dry hydrate of soda in the solution, and dried down with constant stirring, many of the foreign salts are decomposed; and when the colored powder is treated with hot water, and the solution evaporated, the salts of soda first fall and are dipped out, and the heat is continued until the superfluous water is driven off, and the hydrate

is fused. Caustic soda of very good quality is thus obtained. According to Payen, the present quantity of soda produced in France is 90,000,000 kilogrammes (90,000 tons), in England 150,000,000 (150,000 tons), and in all the world 300,000,000 (300,000 tons).—The bicarbonate of soda is obtained by passing a current of carbonic acid gas through a solution of carbonate, and crystallizing, or by submitting moist crystals of the carbonate to the action of carbonic acid. In the last case it is obtained in opaque amorphous masses. It is employed in medicine. The sesquicarbonate is found native in great quantities in certain Egyptian lakes, in Hungary, in Fezzan near the desert of Sahara, and in various parts of America. It is known as *natron* or *trona*.—The most important salts of soda with organic acids are the acetate, which is formed in great quantity in the purification of pyroligneous acid; the tartrate of soda and potash (Rochelle salts), used in medicine; the tartrate of soda and antimony (soda tartar emetic), also used in medicine; and the salts with stearic, margaric, and oleic acids, forming soaps.

**SODA POWDERS.** See **EFFERVESCING POWDERS.**

**SODA WATER.** See **SELTZER WATER.**

**SODIUM**, or **NATRUM** (from *natron*, the ancient name of soda), the metallic base of soda, Na; chemical equivalent, 23; specific gravity 0.935 to 0.972. It is silver white, with a high lustre; crystallizes in cubes; is pretty hard at 0° F., of the consistence of wax at ordinary temperatures, and completely liquid at 194°, and volatilizes at a bright red heat. When a globule of sodium is thrown upon water, it decomposes it rapidly with the evolution of hydrogen; but the heat produced is not sufficient, as with potassium, to inflame the gas, unless the water is hot, or is thickened with gum, so as to check the movement of the globule. From its avidity for oxygen, sodium requires to be preserved under naphtha. It is very generally diffused throughout nature, though apparently somewhat less abundantly than potassium in the solid crust of the globe. In the vegetable kingdom it occurs as sulphate of soda, iodide and chloride of sodium, and combined with vegetable acids, especially in plants growing in or near the sea; in the animal kingdom, combined with chlorine, with carbonic, sulphuric, phosphoric, and various organic acids. This metal was discovered in 1808 by Sir H. Davy, who prepared it by decomposing caustic soda by a voltaic current. Gay-Lussac and Thénard afterward made it more abundantly by heating a strong mixture of caustic soda and iron turnings in a gun barrel, the distilled sodium being received into a vessel filled with mineral naphtha. M. Brunner next introduced the process of decomposing at a high temperature carbonate of soda, previously intimately mixed with finely powdered charcoal. M. Ste. Claire Deville, in the course of his experiments on the manufacture of aluminum on a large scale, to the suc-

cess of which a cheap and abundant supply of sodium was necessary (see **ALUMINUM**), improved Brunner's process by adding to the mixture of carbonate of soda and charcoal a certain quantity of chalk, which opposes the fusion and swelling up of the materials, and aids in furnishing carbonic oxide gas, which facilitates the vaporization of the sodium. He also substituted bituminous coal for charcoal, which has the advantage of adding to the reducing gases various hydrocarbons. The process, as now conducted at the works of MM. Deville and Morin, is as follows. A mixture of 1,000 parts of dry carbonate of soda, 150 parts of dried chalk, and 450 parts of bituminous coal is submitted to a calcination or fritting, which reduces the bulk so much as to allow 7½ kilogrammes (16.58 lbs.) instead of 5½ (12.12 lbs.) to be introduced into the distillation cylinders. These are made of strong sheet iron, ½ to ¾ inch thick, bent, pierced, and riveted in the cold, are 12 centimetres (4.72 inches) in diameter and 80 (31.5 inches) in length, and can be closed at each end by cast iron plates, one of which is pierced with a round hole. The charged cylinders are placed in pairs in a furnace, and heated as regularly as possible to a white heat. Traces of watery vapor first escape through the hole in the head, then the hydrocarbons of the coal, then carbonic oxide arising from the reduction of the carbonates, the soda, and the carbonic acid, and from the oxidation of the carbon, which brings with it some carbonaceous particles. These gases give a reddish flame, which assumes a bluish tint when the vapor of sodium begins to mingle with it. A short tube is then adapted to the hole in the head of each cylinder, communicating at the other extremity with a large refrigerant of sheet iron, ¼ of an inch thick. The object of this is to suddenly reduce the temperature from a white heat to or below a dull red heat, for a simultaneous production then takes place of carbonic oxide gas, and vapors of sodium, which are then condensed; while, if the transition is slowly effected, the products at a bright red heat, by a new reaction, are only soda and carbon (or such compounds as rhodizonate, croconate, &c., of soda). The condensed sodium flows from the refrigerant into a recipient half filled with naphtha or some of the heavy coal oils. The operation lasts two hours from the time that the heat is sufficient to inflame the gases. Before proceeding to another charge, the cylinders are cleaned with an iron scraper. They then receive a charge of 5.5 kilogrammes each, and the operation proceeds as before. The sodium is purified by redistillation from an iron retort, or sometimes by merely remelting it in an iron pot, and allowing the impurities to subside. It is then cast into bars, and preserved under naphtha or heavy coal oil. Concretions of soda and lime, brought over in the form of dust and retaining a little sodium, remain in the refrigerant, and when scraped out and redistilled yield a small additional quantity of sodium. The total

product is about 1.2 kilogrammes of crude sodium, yielding 1.1 (2,424 lbs.) of purified bars. The sodium thus obtained costs, according to Payen (in 1859), 80 francs or \$5.79 per kilogramme, instead of its former price of 1,000 francs. One of the principal elements of cost consists in the sheet iron cylinders, which must be renewed after two operations. Their durability may be increased by surrounding them with a lute of refractory clay, and heating them on the bed of a reverberatory furnace, which might be done whenever the consumption of aluminum requires the manufacture of sodium on a large scale. The principal use of sodium is in the manufacture of aluminum, and the other earthy metals are also produced by its aid.—Sodium forms two combinations with oxygen: 1, soda, NaO (see SODA), and 2, peroxide of sodium. The latter, which may be obtained by heating to redness soda or hydrate of soda in contact with air or oxygen, or by the ignition of nitrate of soda, is a dirty greenish yellow substance, less fusible than hydrate of soda, and a non-conductor of electricity. Its composition is still uncertain, as it has never been obtained unmixed with soda, but is probably Na<sub>2</sub>O<sub>2</sub>. It is easily decomposed. A suboxide is also said to exist. Sodium forms several compounds with sulphur, but only one, the monosulphuret, NaS, is well defined and stable. Its solution, which is prepared by passing sulphuretted hydrogen through a strong solution of caustic soda, is colorless, and can be preserved for a long time without sensible alteration, rendering it very valuable as a chemical reagent. The higher sulphurets are obtained by heating carbonate of soda or the monosulphuret with an excess of sulphur; one is known as the soda liver of sulphur. A compound of sodium with phosphorus is produced by heating them together. It is a lead-colored substance, which burns when heated in the air, producing phosphate of soda. Sodium forms but one compound with chlorine, common salt, NaCl (see SALT); with iodine, bromine, and fluorine, several. With aluminum it forms two double salts of much interest. The first, the double chloride (NaCl, Al, Cl<sub>3</sub>), has been used with advantage in the preparation of aluminum (see ALUMINUM), and is prepared by passing a current of chlorine over a mixture of 100 parts of alumina, 120 parts of common salt, and 40 parts of charcoal, made up in balls of the size of the fist, with a little water, dried, and heated in earthen cylinders about 4 feet high and 8 inches in diameter, provided with earthen tubes which convey the vapors of the double chloride into a recipient where they solidify. After remelting, to remove some impurities, the product is ready for use. The double fluoride, 3NaF, Al, F<sub>3</sub>, occurs in large quantities in Greenland. (See CRYOLITE.)

SODOM, one of the southern border towns of the Canaanites (Gen. x. 19), which, with Gomorrah, Admah, and Zeboim (Deut. xxix. 23), was destroyed on account of the wickedness of the inhabitants. It was situated in or

near the fertile valley of Siddim (Gen. xiv. 8), and its site is now covered by the southern portion of the Dead sea. Lot, after separating from Abraham, settled in Sodom, which at that time had its own king. The crime against nature, on account of which, according to Genesis, the city was destroyed, has been called after it. The name has also been preserved in a plant called apple of Sodom, mentioned by Josephus, which by most modern writers (Robinson, Seetzen, &c.) is identified with a plant called by the Arabs *osher*.

SOFALA, a tract of country on the E. coast of Africa, comprehended within the territory known as Mozambique. It extends from about lat. 18° to 24° S., and from the seaboard to the Lupata mountains, having an extreme length of about 400 m. and a breadth of 200 m. Along the coast the land is low and sandy or swampy, but rises toward the interior till it terminates in the mountain range already mentioned. The country is watered by several considerable rivers, which annually overflow their banks; the most important are the Sofala, the Bocias, the Sabia, and the Inhamban. There are mines of iron and copper, and gold, topazes, and rubies are found. The Portuguese possessions in Sofala occupy an area of about 10,000 sq. m., and have a population of 287,000. They comprise the districts of Quilimane, Sena, Tete, Chickowa, and Zumbo. The lieutenant-governor of these territories is under the governor of Mozambique, and resides at Sena.—SOFALA, a town in the above country, and formerly the capital of a native kingdom, is situated at the mouth of the river Sofala, in lat. 20° S., long. 35° E. It has a fort and a church, and consists of a few mud and straw huts, though once a place of considerable trade. The climate is very unhealthy. Some gold dust is exported, and some authors have supposed that it is the Ophir of the ancients.

SOIL. See AGRICULTURE.

SOISSONS (anc. *Noviodunum*, and afterward *Augusta Suessionum*), a fortified town of France, in the department of Aisne, on the left bank of the river Aisne, 60 m. N. E. from Paris; pop. in 1856, 7,686. It has a cathedral built in the 12th and 13th centuries, the ruined abbey of St. Jean des Vignes, a castle, and a college. In the environs is the abbey of St. Médard, founded by Clothaire I. in 557, in which Louis le Débonnaire was confined by his sons, and now occupied as an institute for deaf mutes. There are manufactures of fine tapestry, linen, hosiery, cordage, earthenware, and leather.—Soissons was the chief place of the Suessiones in the time of Cæsar, and in the 6th century the capital of Clovis, and gave name to the kingdom of his 4th son. It has sustained many sieges, the last by the allies in 1814. The council which condemned the doctrines of Abelard met here in 1122.

SOLAN GOOSE. See GANNET.

SOLANDER, DANIEL CHARLES, a Swedish naturalist, born in the province of Norrland,

Feb. 28, 1736, died in London in 1782. He was educated at Upsal under Linnæus. After receiving the degree of M.D. he made a tour in Russia, went to the Canary isles, where he spent some time in studying their natural history, and thence reached England in 1760, and was soon after employed in preparing a catalogue of the collections in the British museum, and subsequently as an assistant in the natural history department. In 1766 he published a catalogue of the Brander collection of fossils in the British museum. In 1768 he accompanied Sir Joseph Banks on Capt. Cook's first voyage round the world. In 1773 he was appointed under librarian to the British museum, which office he held until his death. He published several papers in the "Transactions" of the royal and other societies, and left a large number of manuscripts on scientific topics which are still preserved in the museum.

**SOLANO**, a N. W. co. of California, bounded S. E. by Sacramento river and S. by Suisun bay; area, 906 sq. m.; pop. in 1860, 7,170. The surface is broken, and contains several beautiful and fertile valleys. The W. part is mountainous. Mare island, on which is a U. S. navy yard, is within the county. The productions in 1858 were 165,160 bushels of wheat, 164,175 of barley, and 24,990 of oats. There are excellent mineral springs, and veins of coal and marble. Capital, Benicia.

**SOLAR SYSTEM.** See **ASTRONOMY**.

**SOLAR TIME.** See **DAY**.

**SOLDER.** See **ALLOY**, and **BRAZING**.

**SOLDIER.** See **ARMY**, **ARTILLERY**, **CAVALRY**, and **INFANTRY**.

**SOLE** (*solea*, Cuv.), a genus of soft-rayed flat fishes of the family *pleuronectida*, the characters of which have been given under **FLOUNDER**. The genus is characterized by the jaws concealed under the scaly skin, the upper rounded and longest; the eyes are both on the right side, small, the lower behind the upper and almost at the angle of the mouth; the mouth is curved, and turned almost wholly to the left side, and the fine and villiform teeth are nearly all on this side; the snout is in advance of the mouth; the lateral line straight; branchial openings below the small pectorals; dorsal and anal very long, often confluent with the caudal; no air bladder, and no pancreatic cæca, and the intestine long and often doubled; the blind side is sometimes furnished with shred-like villi. The common sole (*S. vulgaris*, Cuv.) has the body more elongated than in most flat fishes, with a blunt and rounded muzzle; the length is from 10 to 20 inches, and the color uniform dark brown above and white below, the pectorals tipped with black. It inhabits the sandy shores of Great Britain, keeping near the bottom, feeding on the spawn and fry of other fishes and on shell fish; it is found from the seas of Scandinavia to the Mediterranean. It is one of the best and most delicate fishes for the table, and is caught in immense numbers by trawl nets; 86,000 bushels have been brought

to Billingsgate market alone in a year; it is one of the most important fisheries; the flesh is white and firm, and is in good condition all the year except in February and March, when they are spawning. Some are found reversed, or with the eyes and colored surface on the left side, and a few are dark and rough on both sides. The lemon or French sole (*S. pegusa*, Yarr.) is smaller, yellowish brown above spotted with darker brown, wider, and thicker. In the genus *monochirus* (Cuv.) there is no pectoral on the blind side, and the other is very small. Here belongs the variegated sole (*M. linguatulus*, Cuv.), reddish brown above, clouded both on the body and fins with darker; the scales large and harsh; it is about 10 inches long, and inhabits the seas of Europe. In *achirus* (Lac.) there are no pectorals; species are found in the Indian seas, with the upper parts marbled with brown and lighter. To this genus belongs the New York sole (*A. mollis*, Mitch.), 6 to 8 inches long, dark brown, marked transversely with irregular black bands, and scales small; it is found from Nantucket to Carolina.

**SOLEISM** (Gr. *σολοικισμος*), an ungrammatical use of language. The word is derived from Soli, a city of Cilicia, whose inhabitants were famous at Athens for their incorrect and inelegant speech.

**SOLEURE**, or **SOLOTHURN**, a N. W. canton of Switzerland, composed of two unequal parts, and bounded by Basel Landschaft, Aargau, Bern, and France; area, 280 sq. m.; pop. in 1860, 69,527, of whom 59,749 were Roman Catholics. The Jura mountains occupy a part of the canton, and the remainder of the surface is level and fertile. It is traversed by the river Aar, a tributary of the Rhine. Gold, silver, iron, and lignite are found. The soil is remarkably fertile, both on the lower grounds and mountain slopes. A great deal of the surface is occupied by meadows and pastures, upon which large numbers of cattle are kept. The forests are extensive, and contain much valuable timber. German is the language of the canton. The government was formerly aristocratic, but democratic principles have been largely introduced into it, especially by the revision of the constitution in 1841. The capital, Soleure, is situated at the foot of the Weissenstein, on the Aar; pop. 6,000.

**SOLFAING.** See **SOLMIZATION**.

**SOLFERINO**, a village of Italy in E. Lombardy, near Castiglione. It has a ruined castle, formerly the seat of a prince of Solferino; but it is principally remarkable for the great battle fought here between the allied French and Sardinian forces and the Austrians on June 24, 1859. This battle lasted 16 hours, and 4 French *corps d'armée* under Marshals Baraguay d'Hilliers, MacMahon, Canrobert, and Niel, and led by the emperor Napoleon III., and 4 divisions of the Sardinian army, commanded by Victor Emanuel in person, were opposed to an immense Austrian force, under the command of the emperor Francis Joseph. The points at

which the struggle was most severe were the heights of the village of Solferino, which were captured after a long and terrible fight by the first corps under Marshal Baraguay d'Hilliers; the height of Medole, from which Gen. Niel with the 4th corps drove the Austrians, though at a heavy loss, to the villages of Rebecco and Guiddezolo; the village of Capriana, which was the scene of a desperate strife; and the vicinity of Rivoltella, where Victor Emanuel and the Sardinians contended long and successfully with the enemy. The battle was finally gained by the allies in consequence of the greater range of their artillery and rifles, and the desperate and reckless bravery of the Zouave corps. The French army had 12,000 men killed and wounded, 150 officers killed, and 720 *hors du combat*; the Sardinians 5,000 killed, wounded, and missing. The Austrians lost many more in killed and wounded than the allies, and beside left in their hands 4 standards, 30 cannon, and 6,000 prisoners.

**SOLGER, KARL WILHELM FERDINAND**, a German writer on æsthetics, born in Schwedt, Brandenburg, Nov. 28, 1780, died in Berlin, Oct. 20, 1819. He studied the classics at Berlin and the law at Halle, interesting himself also in æsthetic and philosophical inquiries, attended the lectures of Schelling at Jena in 1801, received a civil appointment in 1803 in Berlin, where he heard the lectures of Fichte, and in 1806 retired to Schwedt, and completed there his translation of Sophocles (2 vols., Berlin, 1808; 2d ed., 1824). He became professor at Frankfort-on-the-Oder in 1809, and at Berlin in 1811. He published *Erwin: vier Gespräche über das Schöne und die Kunst* (2 vols., Berlin, 1815), and *Philosophische Gespräche* (Berlin, 1817). After his death, his *Nachgelassene Schriften und Briefwechsel* were edited by Tieck and Von Raumer (2 vols., Leipsic, 1826), and his *Vorlesungen über die Aesthetik* by Heyse (Berlin, 1829).

**SOLIMAN**. See **SOLYMAN**.

**SOLIPEDA**, a term employed by Cuvier and other naturalists for the pachyderms which have only one apparent toe and a single hoof on each foot, like the horse, ass, and zebra. *Solidungula* is an equivalent term used by Owen and others.

**SOLIS, ANTONIO DE**, a Spanish historian and poet, born in Alcalá de Henares, July 18, 1610, died in Madrid, April 19, 1686. He studied the civil and canon law at the university of Salamanca, and wrote his first play while there. In 1642 he was appointed to a lucrative office under the secretary of state, and after the death of Philip IV. was created first historiographer of the transactions of the Spaniards in both Indies. He entered holy orders in 1667, and died in extreme poverty. Out of Spain Solis is best known by his *Historia de la conquista de Mexico* (fol., Madrid, 1684). His principal plays are *El alcazar del secreto*, *La Gitamilla de Madrid* (which is reproduced in Rowley and Middleton's "Spanish Gypsy" and Victor Hugo's

*Notre Dame de Paris*), and *Un bobo hace ciento*. His plays, 14 in number, were published collectively at Madrid in 1732.

**SOLITAIRE**, a wingless bird of the dodo family, the *didus solitarius* (Gmel.) or the *pezophaps solitaria* (Strickland), a native of the little island of Rodriguez, a few miles E. of Mauritius; like the rest of its family, if not now existing, it has become extinct within a few centuries. According to the French voyager Leguat, the male was brownish gray, a little larger than a turkey, which it resembled in its feet, but the beak was more hooked, and the neck longer and straighter; the tail very short, and the posterior part of the body rounded; the eyes black and lively, the head without comb or crest, and the feathers of the lower parts imbricated; the weight about 45 lbs.; the female smaller and lighter colored. It received its name from its being generally seen alone, though it was not uncommon on the island; the wings were too short for flight, but were moved rapidly while running, and the hard knob at the end was used as a principal means of defence; hence, though unable to fly, the sternum was provided with a strong keel for the attachment of muscles; it did not run rapidly, and was not very shy. It was monogamous, making a nest on the ground of the leaves of the palm, laying one egg, larger than that of a goose; the young required to be fed in the nest. The flesh was said to be fat and good eating, and the food to be the fruit of the date palm. Though belonging to the dodo family, it had a longer neck and head, a shorter beak, and more developed wings; the toes were 8 in front and 1 behind, and the bill was 2 inches long and of a red color. Another allied bird in the island of Bourbon, called also solitaire, was whitish or light yellow, with the tips of the wings and tail black; it was as large as a goose. The bones found contain almost all their animal matter. It is considered by Messrs. Strickland and Melville, in their work on "The Dodo and its Kindred" (4to., London, 1848), as a terrestrial modification of the *treronina*, but having no immediate affinity with other ground pigeons. See also "Proceedings of the Zoological Society of London" for 1851, pp. 280-284.

**SOLMIZATION**, in singing, the art of applying to the 7 notes of the musical scale certain syllables, designated *do, re, mi, fa, sol, la, si*, by the use of which the singer is enabled to utter the sound with more fulness and freedom, and to remember more exactly the places of the tones and semi-tones. The art was practised by the Greeks, but the syllables in general use at present, with the exception of the first, altered from *ut* to *do* on account of the euphony, and of the last, which was added by the French, were introduced by Guido Aretino. The octave is completed by the repetition of the first syllable, *do*; and in singing, all the syllables retain their Italian pronunciation.

**SOLOMON**. See **HEBREWS**, vol. ix. p. 32.



SOLOMON, SONG OF. See CANTICLES.

SOLOMON, WISDOM OF. See WISDOM OF SOLOMON.

SOLOMON BEN ISAAC, rabbi, erroneously surnamed YABHI, and generally known under the abbreviation RASHI (the initials of the Hebrew *Rabbi Shelomoh Yitzhaki*), a Jewish commentator of the Bible and Talmud, born in Troyes, France, about 1040, died there, July 13, 1105. His comments on both the Hebrew Scriptures and the Talmud have till this day served as the principal manual, in Hebrew, of the youthful student, as well as of the scholar. Those on the Bible have been translated into Latin by Breithaupt (3 vols., Gotha, 1710-'14). A critical essay on Rashi has been written in German by Dr. Zunz (in the *Zeitschrift für die Wissenschaft des Judenthums*, 1822), and translated into Hebrew by Samson Bloch.

SOLOMON ISLANDS, a group of the S. Pacific lying to the S. E. of New Britain and E. of New Guinea, extending in a S. E. direction from lat. 4° 50' to 11° 50' S., and from long. 154° 30' to 162° 30' E. The group is composed of 9 principal and several smaller islands, the area of the whole being estimated at 10,000 sq. m. The largest of the islands is about 130 m. long and 20 broad; but they have never been surveyed. Mountains, often of considerable height, traverse them. The shores are generally low, and in some places bordered with mangrove swamps. They are watered by numerous streams, and the temperature cooled by copious rains. They are inhabited by two races, the negrito, black with woolly hair, and the Malay, copper-colored with straight or curly hair and much better looking. The population is very irregularly distributed, the N. islands being more populous than the others. They were discovered by the Spanish navigator Mendana in 1567, and rediscovered by Carteret in 1767.

SOLOMON'S SEAL (*polygatum*, Tournefort), a genus of herbaceous perennial plants, with jointed tuberous roots, belonging to the lily family. The common Solomon's seal (*P. vulgare*) has creeping, fleshy, strong-scented, and knobby or jointed rhizomes, and its trivial name is derived from certain marks perceptible on the transverse sections of these joints, resembling cabalistic characters. This species is a native of Europe, and is cultivated in gardens, its alternate, clasping, broadly elliptical, acute, ribbed leaves, greenish white, axillary, pendulous flowers, and spherical dark blue berries rendering it attractive. A variety with double flowers is known. There are several North American species. The greater Solomon's seal (*P. giganteum*, Dietrich), supposed by some to be identical with the common kind, has a tall, stout, terete stem, ovate, partly clasping, many-nerved leaves, and axillary flowers with 2 to 8 peduncles; it occurs in alluvial soils. The 2-flowered Solomon's seal (*P. biflorum*, Ell.) is more common on wooded banks; its stem is slender, 1 to 3 feet high; its

leaves ovate oblong or lance-oblong, nearly sessile, and pubescent; its peduncles mostly 2-flowered. All the species grow readily.

SOLON, the Athenian lawgiver, born about 688 B. C., died in Athens about 559. He was of the purest heroic blood, his father being a descendant of Codrus, and his mother a cousin of the mother of Pisistratus. In his youth he visited many parts of Greece and Asia as a merchant, gained distinction by his poems while there was as yet no Greek prose, and from his reputation for political wisdom was reckoned, in all the lists, one of the seven sages. After returning to Athens, he began his political career by recovering Salamis from the Megarians. The Athenians had repeatedly failed in their attempts upon this island, and had prohibited any citizen on pain of death from proposing a renewal of the enterprise. Solon counterfeited madness, and in apparent frenzy read in the agora a short poem, the effect of which was that the law was rescinded, war declared, and he himself appointed to the command of it. In a single campaign (about 600 B. C.) the Megarians were expelled from the island, but a tedious conflict ensued, which was finally settled in favor of Athens by the arbitration of Sparta. Soon after, in the Amphictyonic council, he moved the decree by which the Athenians espoused the cause of the Delphian oracle against Cirrha. In 594 B. C., when his fame for wisdom and integrity was spread throughout Greece, when he derived a double influence from his connection by birth with the aristocrats and by occupation with the commercial classes, and when civil dissensions and the miserable condition of the poorer classes had made society in Athens intolerable, he was called by all parties to the archonship, with powers substantially dictatorial, and chiefly with authority to confirm, repeal, or modify the Draconian laws. It is undoubted that he might have made himself despot, and that his friends were disappointed at his refusal to do so. The constitution of Solon (see ATHENS, vol. ii. p. 269), which made property instead of birth the title of citizenship, and which was the prelude to the subsequent democracy, was proclaimed and accepted without discussion or resistance, and by a solemn oath of the government and people was declared valid without alteration for 10 years. He obtained leave of absence for that period; visited Egypt, and conversed on matters of an unknown antiquity with the priests Psenophis of Heliopolis and Sonchis of Sais; and went thence to Cyprus, where he persuaded the prince of Æpea to change the site of the town, and himself made the regulations for the prosperity of the new establishment, which in his honor was called Soli. The story, related by Herodotus, of an interview between him and Cræsus at Sardis, seems irreconcilable with chronology. He returned to Athens prior to the first usurpation of Pisistratus (560 B. C.), and amid violent dissensions was respected by all parties,

but was unable to overrule the popular favor of his kinsman. He attempted in vain to rouse the citizens against the usurper, from whom, however, he did not withhold his advice when opposition had proved futile.—The chief sources for the biography of Solon are the compilations of Plutarch and Diogenes Laërtius. The extant fragments of his poems are usually contained in the collections of the Greek gnomic poets, and there is a separate edition by Bach (Leyden, 1825).

**SOLSTICE** (Lat. *sol*, the sun, and *sto*, to stand), the period in the annual revolution of the earth round the sun, when he is at that point in the ecliptic furthest north or south from the equator, or in other words reaches his greatest northern or southern declination. There are two solstices in the year: the summer solstice, June 22, when the sun seems to traverse the tropic of Cancer; and the winter solstice, Dec. 22, when he reaches his greatest southern declination, and appears to traverse the tropic of Capricorn. For several days before and after the solstice there is but a slight variation in the sun's apparent declination, and he is said to stand still. The solstitial points are the two points of the ecliptic at which the sun's greatest elevation above or depression below the equator terminates, and a circle supposed to pass through these points and the poles of the earth is called the solstitial colure.

**SOLTIKOFF**, the name of a Russian family, prominent since the 16th century. I. PRASKOVYA FEDOROVNA (died in 1696) became wife of the czar Ivan Alexeievitch, and mother of the empress Anna. II. SEMEN, governor of Moscow, was in 1732 raised by his aunt, the empress Anna, to the dignity of count in the Russian nobility. III. PETER SEMENOVITCH, count, son of the preceding, received in 1759 the chief command of the Russian army in the 7 years' war, gained in conjunction with the Austrian general Loudon the decisive victory of Kunersdorf (Aug. 12, 1759) over Frederic the Great, was afterward governor-general of Moscow, and died in 1772. IV. NICOLAI IVANOVITCH, of another branch of the family, a Russian statesman, born Oct. 24, 1736, died in St. Petersburg, May 28, 1816. He was tutor to Alexander, who was afterward emperor, became field marshal in 1796, and president of the imperial council in 1812; and during the absence of Alexander in 1813-'15 he held the authority of regent of the empire. In 1814 he was raised to the rank of prince. V. SERGEI, prince, grandson of the preceding, travelled in Persia in 1838 and in the East Indies from 1841 to 1846, and has published narratives in the French and Russian languages: *Voyages dans l'Inde* (Paris, 1849), and *Voyage en Perse* (Paris, 1851).

**SOLUBLE GLASS**. See **SILICATES**, **SOLUBLE**.

**SOLWAY FRITH**, an arm of the Irish sea, which extends in a N. E. direction, between England and Scotland, about 41 m., with a breadth varying from 20 m., between St. Bees Head in Cumberland and Rayberry Head in

Kirkcudbrightshire, to 2 m. It receives upon the English side the rivers Derwent, Ellen, Waver, Wampool, and Eden; and upon the Scottish side, the Urr, Nith, and Annan. Whitehaven, Maryport, and Allenby are situated on the English side, and Annan and Kirkcudbright on the Scottish. At ebb tide a large portion of the frith is left dry; and its water is always much discolored by the sand and earth carried into it by the streams. There are several valuable salmon fisheries upon the rivers which flow into it.

**SOLYMAN II.**, called the **MAGNIFICENT**, the 10th Ottoman sultan, born in 1494, died Aug. 30, 1566. He was the son of Selim I., whom he succeeded in 1520. Differently educated from Ottoman princes in general, he had received instruction upon politics and government, and began his reign with the reformation of abuses. In 1521 he subdued the rebellion of Gozeli Bey in Syria, and in Hungary took Belgrade, Szalánkemen, and Peterwardein. After an arduous siege he took Rhodes from the knights of St. John in 1522. He invaded Hungary a second time in 1526, won the decisive battle of Mohács, in which the king of Hungary, Louis II., was slain, overran a part of the kingdom, and recognized as king John Zápolya, who put himself under Solyman's protection. This act embroiled the sultan with the rival king, Ferdinand I. of Hapsburg, and began the first of the Turkish wars against Germany. In 1529 Solyman took Buda, and appeared before Vienna with an army 120,000 strong; but after 20 assaults he retired with a loss of 80,000 men. A second attempt in 1532 was not more successful. In 1534 he invaded Persia, and subdued Armenia and Irak, with the cities of Tabriz and Bagdad; in 1536 formed an alliance with Francis I. of France against Charles V., the brother of Ferdinand; in the same year created the Barbary corsair Khair-ed-Deen or Barbarossa a Turkish admiral, and thus swept the Mediterranean and the Italian coasts; conquered Croatia in 1537 by a great victory over the imperialists at Eszek; and in 1538 made the conquest of Yemen. Upon the death of John Zápolya in 1540, he supported his son Sigismund Zápolya, and continued the war with Ferdinand until 1547, when a truce was agreed upon under which that prince paid tribute for his remaining Hungarian possessions. In 1552 he again invaded Persia, in 1548 gained a great battle at Van in Armenia, and in 1549-'50 conquered the provinces of Shirvan and Georgia. Hostilities in Hungary were renewed in 1552. Transylvania was made a Turkish principality, and his fleets under Piali, the successor of Khair-ed-Deen, gained a great victory over the combined fleets of the emperor at Jerba on the African coast. A truce made in 1562 left the Turks in possession of their Hungarian conquests. In an attempt upon Malta in 1565, the whole naval force of Solyman was repulsed. In 1566 he again led a vast army to the invasion of Hungary, crossed the Drave, and laid

siege to the fortress of Szigeth, which was defended by a small garrison under the heroic Zrinyi; but a paroxysm of anger at the terrible repulses he encountered induced an attack of apoplexy, in which he died a few days before the last and fatal assault was made. Under this sultan the Ottoman empire attained its greatest military power, beginning immediately to decline under his successor, Selim II. By the Turks he was surnamed the Legislator, and the *Kanoon-Nameh*, or code of laws and regulations, drawn up under his direction, formed the basis for a long period of the Turkish administration of government and justice. He was also a patron of literature and art; in his reign the use of the Turkish language in literature superseded that of the Persian.

SOMAULEES. See ESSAH.

SOMERS, JOHN, lord, an English jurist and statesman, born in Worcester about 1650, died April 26, 1716. He was educated at Trinity college, Oxford, and in 1676 was called to the bar at the Middle Temple, but continued to reside for several years longer at the university. During this period he published several important political pamphlets, and a variety of metrical and prose versions from classical authors, comprising his chief literary productions. In 1682 he commenced the practice of the law in London, and the erudition and ability which he displayed in several political trials, particularly that of the 7 bishops in 1688, brought him into great professional eminence. Thenceforth he took his place among the leaders of the whig party. He represented Worcester in the convention which met in Jan. 1689, and was a member of the two committees (acting as chairman of the second) which prepared the "Declaration of Right"—a paper emanating perhaps wholly from him. Having secured the favor of the king, he was in 1689 appointed solicitor-general and knighted, in 1692 attorney-general, and in 1693 made lord keeper of the great seal. In 1697 he was appointed lord chancellor and raised to the peerage as Baron Somers of Evesham. From the time when he accepted the great seal, he had held an influential place in the cabinet. After ineffectual attempts to fasten upon him a charge of maladministration, and also of complicity in the piracies of Capt. Kidd, whom he had helped fit out a ship for the purpose of capturing pirates, a motion was made in the house of commons, April 10, 1700, that the king should be requested to dismiss him from office, which failed by a decided vote. But as Somers had been absent, by design as his enemies said, but really through sickness, during the debates which preceded the passage of the bill for resuming the king's Irish grants, a measure exceedingly distasteful to William, he was on the 17th of the same month removed from office. In the next year an attempt was made to impeach Somers on 14 distinct charges, the most important of which referred to an illegal issue at the king's request of blank commissions under the

great seal for the purpose of negotiating certain treaties; to his alleged complicity with Kidd; and to his acquisition of various unreasonable and exorbitant grants from the crown in addition to the salary and fees of his office. After many conferences between the two houses, the commons declined to prosecute their impeachment on the day named by the lords, whereupon the latter declared Somers acquitted. Somers soon recovered the favor of the king, and but for the death of the latter would probably have soon been restored to power. William's last speech to parliament, Dec. 31, 1701, which Burnet commends as "the best that he or perhaps any other prince ever made to his people," was the production of Somers. For several years he devoted himself to ordinary parliamentary duties, among the most important of which was the passage of a bill "for the amendment of the law and the better advancement of justice;" and he took a leading part in the measure for the union of Scotland and England. Upon the accession of the whigs to power in 1708, Somers was appointed president of the council, and held the office until the return of Harley and the tories in 1711. Subsequently he participated in legislative duties until his death, which happened from apoplexy. Macaulay calls Somers "in some respects the greatest man of that age, equally eminent as a jurist and as a politician, as an orator and as a writer." Of his personal character very conflicting opinions were entertained during his life, the tories attacking him with a malignity which never provoked him into an unworthy act, and the whigs extolling him to the skies. To the extent of his acquirements and the charm of his conversation all his contemporaries bear witness, as well as to his invariably good temper. A number of original letters and papers, illustrating his life and character, perished by fire in 1752. The so called "Somers Tracts," published in 16 vols. 4to. (1748-'52; new edition by Sir Walter Scott, 13 vols. 4to., 1809-'15), consist of pamphlets selected chiefly from his library.

SOMERS ISLANDS. See BERMUDAS.

SOMERSET. I. A N. W. co. of Me., bordering on Canada East, intersected by the Kennebec river, and drained by the head streams of the Penobscot and Walloostook rivers; area, 3,800 sq. m.; pop. in 1860, 36,754. The surface is diversified and the soil generally good. There are several small lakes, and the N. part is covered with forests, affording vast quantities of timber for export. The productions in 1850 were 56,595 bushels of wheat, 183,780 of Indian corn, 328,680 of oats, 327,557 of potatoes, 66,188 tons of hay, and 757,624 lbs. of butter. There were 15 grist mills, 30 saw mills, 20 tanneries, a woollen factory, a foundery, 2 newspaper offices, 42 churches, and 12,086 pupils attending public schools. Capital, Norridgewock. II. A central co. of N. J., bounded N. E. by the Passaic and W. by the Lamington, and intersected by the Raritan river; area,

275 sq. m.; pop. in 1860, 22,057. The surface in some parts is very hilly, and the soil generally fertile, especially along the streams. The productions in 1850 were 109,867 bushels of wheat, 635,678 of Indian corn, 498,222 of oats, 26,631 tons of hay, 564,578 lbs. of butter, and 27,466 of wool. There were 31 grist mills, 8 saw mills, 8 tanneries, 3 woollen factories, 2 newspaper offices, 33 churches, and 4,203 pupils attending public schools. The New Jersey central railroad and Delaware and Raritan canal pass through the county. Capital, Somerville. III. A S. W. co. of Penn., bordering on Md., bounded W. by the Youghiogheny river and Laurel ridge, and intersected in the S. by Castleman's river; area, 1,000 sq. m.; pop. in 1860, 26,784. The surface is generally mountainous, and the soil fertile. The glades are admirably adapted to grazing. The productions in 1850 were 92,136 bushels of wheat, 471,312 of oats, 34,387 of potatoes, 33,618 of buckwheat, 31,166 of Indian corn, 29,620 tons of hay, 777,204 lbs. of butter, 373,798 of maple sugar, and 66,503 of wool. There were 16 grist mills, 24 saw mills, 2 founderies, 21 tanneries, 6 woollen factories, 2 newspaper offices, 63 churches, and in 1860 4,083 pupils attending public schools. The county abounds in bituminous coal, and iron ore, fire clay, and cannel coal of excellent quality are found. The Pittsburg and Connellsville railroad is in course of construction through the county. Capital, Somerset. IV. A S. E. co. of Md., bordering on Del., on the E. shore of Chesapeake bay, bounded N. W. by the Nanticoke and S. by the Pocomoke river and bay, and intersected by the Wicomico and Manokin rivers; area, 500 sq. m.; pop. in 1860, 24,992, of whom 5,089 were slaves. The surface is level and the soil generally fertile. The productions in 1850 were 718,078 bushels of Indian corn, 58,248 of wheat, 71,776 of oats, and 1,768,882 lbs. of tobacco. There were 31 grist mills, 31 saw mills, 2 woollen factories, 5 boat yards, 57 churches, and 821 pupils attending public schools. Capital, Princess Anne.

SOMERSET, EDWARD SEYMOUR, DUKE OF. See SEYMOUR.

SOMERSET, EARL OF. See OVERBURY.

SOMERSETSHIRE, a W. county of England, bounded by Gloucestershire, Wiltshire, Dorsetshire, Devonshire, and the Bristol channel; area, 1,645 sq. m.; pop. in 1861, 444,725. The chief towns are Bath, Wells, Taunton, Bridgewater, and Frome. The coast is indented by several bays, the chief of which is Bridgewater bay. The principal rivers are the Parret, Avon, Frome, Yeo, Axe, and Brue. The Avon, Bridgewater, and other canals, and the Great Western railway intersect the county. The surface is hilly, but there is also a great extent of marshy land, and much of the soil is very fertile. Coal, iron, and lead are largely produced. Woollen cloth, canvas, gloves, paper, glass, and various kinds of iron ware are manufactured. Somersetshire con-

tains many remains of antiquity, and has been the theatre of some remarkable events in English history. It returns 9 members to parliament, beside 2 members for Bristol, which lies partly in another county.

SOMERSWORTH, a township of Strafford co., N. H., 45 m. E. from Concord, bounded E. by Salmon Falls river; pop. in 1860, 4,788. It contains the village of Great Falls, near the falls of that name in Salmon Falls river, celebrated for its extensive manufacturing interests. The Great Falls manufacturing company (capital, \$1,500,000) has 7 mills engaged in the manufacture of cotton drills, print cloths, sheetings, and shirtings, with 83,484 spindles and 2,119 looms, employing 1,172 females and 492 males, and consuming annually 5,230,884 lbs. of cotton. Over 4,000 stoves and 500 tons of iron castings are manufactured every year by the Somersworth machine company. There are steam establishments for the manufacture of doors, blinds, sashes, and boxes for packing boots and shoes, a large machine shop, and a marble manufactory. There are 2 banks, 14 public schools, a public library containing 4,000 volumes, and 6 churches: 1 Baptist, 1 Congregational, 1 Freewill Baptist, 2 Methodist, and 1 Roman Catholic. The village is connected with Boston by the Great Falls branch of the Boston and Maine railroad.

SOMERVILLE, a town of Middlesex co., Mass., on Mystic river and Miller's creek, 3 m. N. N. W. from Boston; pop. in 1860, 8,025. It contains the McLean asylum for the insane, and Tufts college (Universalist) is on the line between this town and Medford. In 1855 there were 2 establishments for bleaching and coloring cotton goods, 2 iron rolling and spike mills, a steam boiler manufactory, a brass foundry, a glass manufactory, a steam planing mill, and an establishment for preparing hair for sofas, chairs, and cushions; and brick making is largely carried on. The value of goods of all kinds manufactured or finished in that year was over \$2,776,000. It is intersected by 5 railroads running into Boston, and is inhabited by many doing business there. It was set off from Charlestown in 1842.

SOMERVILLE, MARY, a British authoress and physicist, born at Jedburgh about 1796. She is the daughter of Vice Admiral Sir William Fairfax, and from her first husband, Samuel Gray, Esq., she acquired her elementary instructions in the mathematical and physical sciences. After his death she removed to Edinburgh, and was soon after married to William Somerville, M.D., of that city. Having attracted attention to her scientific attainments by some experiments on the magnetic influence of the violet rays in the solar spectrum, she prepared for the "Library of Useful Knowledge," at the suggestion of Lord Brougham, a summary of the *Mécanique céleste* of Laplace, under the title of "Mechanism of the Heavens" (8vo., 1832). The book, proving too voluminous for its original destination, appeared as a distinct work. It

was succeeded by a volume "On the Connection of the Physical Sciences" (12mo., 1834), suggested by and growing out of the preliminary dissertation to the "Mechanism of the Heavens;" and after a considerable interval she published her last and best known work, "Physical Geography" (2 vols. 12mo., 1848), a history of the earth in its whole material organization, and of animal and vegetable life. Like every thing emanating from her pen, it is written with great clearness of style and precision of statement, and in occasional passages rises to a considerable degree of eloquence. A 4th edition thoroughly revised was published in 1858, in one thick 12mo. volume. Since 1835 Mrs. Somerville has been an honorary member of the royal astronomical society, and she is now in the receipt of a pension of £300 a year from the civil list, as a reward for her valuable services to literature. She has resided of late years with her family at Florence.

SOMERVILLE, WILLIAM, an English poet, born at Edstone, Warwickshire, in 1692, died July 19, 1742. He was educated at Winchester school and New college, Oxford, and after completing his education settled on a moderate paternal estate in Warwickshire. He lived beyond his means, and in the latter part of his life was harassed by duns, and finally driven into habits of intemperance. His "Chase," a long poem in blank verse illustrating some of the more exciting episodes of rural life, has often been reprinted. He wrote another rural poem, "Field Sports," describing the amusement of hawking, and a variety of miscellaneous pieces of unequal merit.

SOMME, a N. department of France, in the old province of Picardy, bounded N. and N. E. by the departments of Pas-de-Calais and Nord, E. by Aisne, S. and S. W. by Oise and Seine-Inférieure, and W. by the English channel; area, 2,843 sq. m.; pop. in 1856, 566,619. The chief towns are Amiens, the capital, Abbeville, Doullens, Montdidier, Péronne, and Ham. The surface is generally level, but occasionally diversified by low hills and small valleys. It is divided into two nearly equal portions by the river Somme, which flows through it in a W. N. W. direction. Limestone, chalk, gypsum, potters' clay, and coal are found. The soil is carefully cultivated, but not naturally fertile. Cotton, linen, and woollen goods, iron ware, and beet root sugar are manufactured.

SOMMERING, SAMUEL THOMAS VON, a German anatomist and physiologist, born in Thorn in 1755, died in Frankfort-on-the-Main, March 2, 1830. He studied medicine at Göttingen, and became professor of anatomy at Cassel in 1778, and at Mentz in 1784. He engaged in the practice of his profession at Frankfort in 1790, was elected to the academy of sciences of Munich in 1804, became in 1805 privy councillor and physician to the king of Bavaria, and returned to Frankfort in 1820. Of his numerous works, the most important are: *Vom Hirn- und Rückenmark* (1788); *Vom Bau des*

*menachlichen Körpers* (5 vols., 1791-'6; new ed. by Bischoff, Henle, Theile, Valentin, Vogel, and Wagner, 9 vols., 1839-'44); *De Corporis Humani Fabrica* (6 vols., 1794-1801); *Ueber das Organ der Seele* (1796); and treatises on the physiology of the five senses. He held that the brain is not essential to the continuance of life, that the nerves operate independently of it, and that the soul has its seat in a vapor-like fluid in the cavities of the brain.

SOMNAMBULISM (Lat. *somnus*, sleep, and *ambulo*, to walk), literally, the act of walking in sleep, but usually applied to all the movements of a person who while in a condition of sleep acts his dreams. There are 3 kinds of somnambulism, viz.: 1, simple, where the somnambulist is apparently in ordinary health, but rises from his bed, walks, runs, or climbs, or sometimes talks or writes, while asleep; 2, morbid, where there exists a diseased condition, which admits the manifestation of the duality of the human system, the somnambulist sometimes being alternately in the natural and morbid condition, and frequently while in the latter performing acts of which while awake he is incapable; and 3, artificial, which is treated under ANIMAL MAGNETISM. The first class of somnambulists are usually persons of nervous temperament, and the phenomena are generally induced in them either by some violent excitement, or oftener by a morbid condition of the stomach, late suppers, indigestible food, or the like. Some writers advise the placing a wet cloth before their beds, on which they may step, or waking them suddenly in some other way; but such a course is fraught with great danger, as the shock may prove fatal, or at least permanently injurious.—Morbid somnambulism is a condition concerning which we have little positive knowledge. Its phenomena are often very surprising. A shy, diffident girl of 14, for instance, of a nervous temperament, but who has exhibited no extraordinary intellectual powers, and has had but very ordinary education, becomes languid, listless, and pale; complains of pain in the side, and perhaps of an unpleasant feeling in the frontal region; after a while, falling asleep in the daytime, she will rise from her chair, and, imagining herself a preacher to a large audience, go through the preliminary exercises of a religious service, and deliver an extempore sermon, the arrangement and language of which far transcend her waking capacity; and the morbid condition of the system becoming more decided, these somnambulatory paroxysms will recur every other day, or even for a time every day, the discourses being never repetitions either of thought or words. In the case we are describing, which in its general features is similar to a considerable number which have occurred within the last 30 years, the subject recovered her health, and the phenomena ceased after 2 or 3 years. In some instances they have been followed by the death of the somnambulist, in one case (in Sweden) predicted by herself.

The religious character of these somnambulist utterances, though usually explicable from the prevalence of religious excitement in the community at the time when they occur, is not always so; there seems to be a tendency of the mind of the somnambulist to dwell on religious subjects.—The development of the double existence is another of the phenomena of morbid somnambulism, not less remarkable than the preceding, and equally well authenticated. The history of the celebrated seeress of Prevorst, by Dr. Kerner, will be readily recalled; and there are at the present time several cases in which the two states are strongly marked, and the subject remains in each for some weeks, being utterly unconscious while in the one of any event which has occurred while in the other. Though resembling it in some particulars, these cases are not to be confounded with those in a state of ecstasy (see CATALEPSY), there being none of the physical insensibility or muscular rigidity. The causes and cure of this form of somnambulism are alike obscure, but the whole subject is one of great interest and deserving of study.—The following works among others may be consulted: Dr. A. J. Kerner, *Geschichte zweier Somnambulen* (Carlsruhe, 1824), and "The Seeress of Prevorst," translated into English by Mrs. Catharine Crowe (New York, 1845); Macnish's "Philosophy of Sleep;" Abercrombie "On the Intellectual Powers;" Colquhoun's "Animal Magnetism;" Deleuze's "Critical History of Animal Magnetism;" Baron von Reichenbach's "Animal Magnetism;" Dr. Sonders's "Narrative of the Religious Excitement in Sweden;" Dr. Gibson's "Year of Grace, an Account of the great Irish Revival in 1859."

SOMNAUTH, or SOMNATH PATTAN, a walled town of India, in the peninsula of Kattywar, province of Guzerat, on the N. E. shore of the Arabian sea, 28 m. N. W. from Cape Diu; pop. about 5,000. Somnauth is celebrated in the mythological legends of ancient Hindostan, and is now chiefly remarkable as the ancient site of a magnificent temple dedicated to Siva, which formerly attracted great numbers of pilgrims, and was supported, according to Mirkhond, by the revenues of 10,000 villages. It was stormed by Mahmoud of Ghuznee, and its gates carried away as a trophy. They were taken back to India in 1842 by the English, and deposited in the magazine at Agra.

SOMNUS, in the Greek and Roman mythology, the personification and god of sleep. He is described as the son of Night, and brother of Death, in company with whom he is represented in works of art as a youth holding a torch inverted.

SONATA, in music, an instrumental composition comprising several movements, and corresponding in character with the cantata in vocal composition. It is generally written for a single instrument, particularly the pianoforte, and, like the symphony and other forms of instrumental composition, preserves a single general idea through all its movements.

SONDERSHAUSEN. See SCHWARZBURG-SONDERSHAUSEN.

SONE, or SOANE, a river of Hindostan, in the presidency of Bengal, which rises in Gundwana, territory of Nagpore, in lat. 22° 41' N., long. 82° 7' E., near the source of the Nerbudda, and falls into the Ganges 28 m. above Patna, after a course of about 450 m. It flows first N., then N. E., afterward E., and finally N. E., through Nagpore, the British districts of Saugor and Nerbudda, the dominions of the rajah of Rewah, and the British districts of Mirzapore and Shahabad, between the latter of which and Patna it forms the boundary line. Its principal tributaries are the Goput, Hutsoo, Kunder, and Coyle, all of which join it from the S. In its upper course it flows through narrow valleys, but lower down they widen into alluvial plains. It is about 8 m. wide at its junction with the Ganges, but the navigation is of little importance higher up than Daudnagar, about 60 m. from that point. During the rainy season it is 10 or 12 feet deep at Daudnagar, but at other times it is nearly dry. Coal is found upon the banks, and agates and carnelians, known as Sone pebbles, occur.

SONG, a short poetical or musical composition, or more commonly a union of the two. In the latter sense it signifies a vocal melody of any length or character, and is generally limited to an air sung by a single voice. While the science of music was in its infancy, the words of songs were generally superior to the music, but in modern practice this has been in some cases reversed; and it may be said that in English literature, with some important exceptions, as Moore's or Barry Cornwall's songs, the melody is the most prominent feature, the words being only a necessary accessory. The modern German composers have most distinguished themselves as writers of song melodies.

SONNET (It. *sonetto*), a poem consisting of 14 iambic decasyllabic or endecasyllabic lines, rhyming in a peculiar manner. The first 8 lines make two quatrains, and the remaining 6 two tercets. There are two rhymes in the quatrains, the 1st, 4th, 5th, and 8th lines rhyming together, and also the 2d, 3d, 6th, and 7th. This is the best arrangement, as the Italians hold, but others occur, and sometimes, even in Petrarch, the rhymes are alternate. In the tercets greater liberty is allowed; the rhymes may be either 2 or 3, and they may be arranged at the will of the poet, but never in couplets. There are but few Italian precedents for the form which the English poets prior to Milton gave to the sonnet. From the difficulty of continuing the same rhyme, they made it consist of 3 quatrains and a final couplet, each quatrain usually having its own two alternate and independent rhymes. The Anacreontic sonnet is composed of octosyllabic lines. It is doubtful whether the sonnet was the invention of the Italians, or was derived by them from earlier Provençal poets. The oldest extant specimens are in Italian, by Lodo-

vico Vernaccia (about A. D. 1200), and by Piero delle Vigne, chancellor of Frederic II., who flourished early in the 13th century. The first who gave to it the arrangement which subsequently was adopted as its legitimate form, was Guitoned'Arezzo (died 1295). It was carried to its highest excellence by Petrarch, and, though it has since been the favorite style of poetical composition in the Italian language, none of his successors have surpassed him in elegance, harmony, and delicacy of sentiment. There is hardly a cultivated Italian, it has been said, who has not composed a sonnet. The most prolific writer in this department is Torquato Tasso, whose published sonnets exceed 1,000 in number. The Italians esteem most highly the sonnet of Filicaja, entitled *Italia mia*. The Italian sonnet was introduced into Spain by the marquis of Santillana in the 15th century. There, during the two following centuries, it was regarded with extravagant favor, and Ticknor estimates that the number produced in this period exceeds that of all the ballads in the language. It never found much favor in France, and fell into ridicule in the 17th century through the *bouts rimés*, or blank sonnets, in which the rhyming words were first chosen and arranged, while the subject was to be selected and the body of the sonnet to be written afterward. The principal sonnet writers in German are Bürger, A. W. von Schlegel, Tieck, Novalis, Uhland, and Rückert. Goethe composed a few sonnets, the subject of which was the difficulties of its form and the pleasure of overcoming them. A peculiar form of the sonnet was introduced in England by Surrey and Wyatt in the reign of Henry VIII.; and there are numerous sonnets by Sidney, Spenser, Shakespeare, Daniel, Drayton, Drummond, and others. Milton returned to the genuine Italian form, but did not always adhere to it; for in his sonnet to Cromwell there are 3 quatrains terminated by a couplet, and 3 of his 5 Italian sonnets also end in couplets. From the time of Milton for nearly a century there were few sonnets written in England. It was revived, in the Italian form, by Edwards, Gray, and T. Warton, while Bowles, Charlotte Smith, and Helen Maria Williams reverted to the easier form of the old English sonnets. The sonnets of Wordsworth are esteemed, with those of Milton, the best in the language; and this style of composition has been occasionally attempted by most subsequent poets.

SONNINI DE MANONCOURT, CHARLES NICOLAS SIGISBERT, a French traveller and naturalist, born in Lunéville, Feb. 1, 1751, died in Paris, May 29, 1812. He was at first an advocate at Nancy; but having obtained a commission as a marine engineer, he visited and explored Cayenne in 1772, afterward went to the W. coast of Africa, and in 1775 revisited Cayenne, where he passed 2 years in the study of the natural history of the country. On his return to France he spent some time with Buffon, and then joined the African expedition under Baron de Tott

in 1777. After an exploration of Egypt, he visited Greece and its islands and Asia Minor, returning to France in 1780, where he employed himself in the improvement of agriculture and horticulture. He contributed 13 volumes of fishes and 1 of cetacea to Buffon's *Histoire naturelle*, and in connection with Latreille the 4 volumes of reptiles. He lost his fortune by the revolution, and afterward edited a *Bibliothèque physico-économique* (1801-'12). In 1810 he travelled in Moldavia and Wallachia. He was also the author of a *Voyage dans la Haute et Basse Égypte* (3 vols. 8vo., Paris, 1799), and *Voyage en Grèce et en Turquie* (2 vols. 8vo., 1801). He edited and was a large contributor to the *Nouveau dictionnaire d'histoire naturelle* (24 vols. 8vo., 1803-'4).

SONOMA, a N. W. co. of California, bounded S. W. by the Pacific and intersected by the Russian river; area, 1,200 sq. m.; pop. in 1860, 11,867. The surface is broken, and the soil generally fertile. The productions in 1858 were 160,000 bushels of wheat, 240,000 of barley, 119,560 of oats, 34,700 of Indian corn, 18,893 tons of hay, 621,000 lbs. of butter, 384,150 of cheese, and 10,000 gallons of wine. Coal is found, and the springs called the Geysers are in this county. Capital, Santa Rosa.

SONORA, a N. W. state of Mexico, bounded N. by the U. S. territory of Arizona, E. by the state of Chihuahua, S. by Sinaloa, and W. by the gulf of California and Lower California; area, 86,855 sq. m.; pop. 147,133. The chief towns are Ures, the capital, Guaymas, and Villa del Fuerte. The coast is indented by several fine bays, that of Guaymas being the most important. The principal rivers are the Colorado, on the N. part of the W. boundary, Yaqui, Mayo, Del Fuerte, Estello, and Sonora; the last named rises in the N. extremity of the state near lat. 32°, and after a course of about 220 m. in a general S. S. W. direction is lost in an extensive lake. In the W. part of the state there are several lakes, and some lagoons in the neighborhood of the coast. The E. frontier is traversed by the Andes, and several offsets extend for a considerable distance into the state. In other directions the surface is flat and a great deal of the soil fertile. The state possesses every variety of climate found between the tropics and the arctic regions. In the low country the heat is very great in summer, but at other seasons rapid changes of temperature are liable to happen. The mineral wealth of Sonora is very considerable, but the mines are worked in an inefficient manner, and many have been abandoned. All kinds of grain are raised, and sugar cane, coffee, cacao, and different kinds of fruits and vegetables succeed well. A large portion of the state is inhabited by different tribes of Indians, some of whom have been converted to Christianity and subsist chiefly by agriculture, but the greater part are nomadic and often commit great depredations on the whites. Many ranchos and towns once flourishing have been completely deso-



lated by the sanguinary civil wars that were carried on for so long a period.

SONTAG, HENRIETTE, Countess Rossi, a German singer, born in Coblenz, May 18, 1805, died in Mexico, June 18, 1854. She appeared upon the stage in children's parts as early as her 6th year, at 15 made her début at Prague in Boïeldieu's "John of Paris," and soon rose to a foremost place among European vocalists, distinguishing herself not less in the music of her countrymen Weber, Beethoven, and Spohr, than in that of Rossini. Her beauty and dramatic talents were scarcely less conspicuous than her vocal accomplishments, and she competed with Malibran and Pasta for supremacy in the lyric drama until 1830, when she was married to Count Rossi, an Italian nobleman, and retired from the stage. After 20 years of private life she was induced by the pecuniary misfortunes of her husband to resume her profession, sang for several seasons in Europe, then made a successful musical tour in the United States, and died while on a professional visit to Mexico.

SOO-CHOW-FOO, or Soo-Tcheou, a town of China, province of Kiang-su, situated on a lake through which the imperial canal passes, 125 m. S. E. from Nanking and 40 m. E. S. E. from Shanghai; pop. supposed to be about 2,000,000. It consists of the town proper, surrounded by a wall 10 m. in extent, and 4 extensive suburbs. Silk, linen, cotton, hardware, and glass are manufactured. There are many very beautiful gardens in the neighborhood.

SOODAN, SOUDAN, or NIGERIA (more correctly Berr or Biled es-Soodan, the "Land of the Blacks"), an extensive region stretching nearly across the African continent, S. of the Sahara and N. of lat. 6° N., between Nubia and Abyssinia on the E. and Senegambia on the W. The principal mountains in W. Soodan are the Kong chain, of no great height, extending E. and W., which border the S. part of the country; and the principal rivers are the Niger and its tributaries. Houghton, the first European traveller in central Africa, entered Soodan from the W. toward the close of the last century; and several other discoverers have since explored the W. and centre of this region, though the E. part has not yet been visited by travellers. The general character of the country visited is flat, with considerable tracts that are inundated by the rise of the rivers during the rainy season. These tracts are very fertile, and produce maize, millet, rice, tobacco, cotton, &c. The climate is very hot. Soodan is divided into many small states, the principal of which are Bambarra, Timbuctoo, Houssa, Bornoo, Baghermi, Waday, and Adamawa. The recent explorations of Dr. Barth show that the country so far as the 6th parallel is a plain, diversified only at wide distances by insulated mountains of probably not more than 1,000 or 1,200 feet. A remarkable people, with equestrian habits, are known to extend, in an almost uninterrupted chain of independent

states, from the banks of the Senegal to those of the Benoowe in Adamawa; and they are believed to be found in close proximity to the White Nile in lat. 5° N.

SOOFEEISM, or SURISM (Arab. *soof*, wool, from the dress of the devotees), a form of mysticism prevailing from an early period among the Mohammedans, especially in Asia Minor and Persia. The first eminent Soofee was a female saint named Rabia, who appeared about the end of the first century after the Hegira, and who in devotion and self-abnegation resembled Mme. Guyon; and from that time to the present many of the most eminent names in Mohammedan literature have been Soofees, including the Persian poets Hafiz and Jami. The Soofees lay claim to a supernatural intercourse with the Supreme Being, to a mystical identity or union with him, and to miraculous powers derived from such intimate relations to him. Said Abul Khair, who flourished about A. D. 820, was the first to gather these mystics in an organized body.—See Tholuck's *Sufismus* (Berlin, 1820).

SOOLOO ARCHIPELAGO, or Sooloo ISLANDS, a group of the Indian archipelago, bounded N. by the Sooloo sea, E. by the Philippines, S. by the sea of Celebes, and W. by the E. extremity of Borneo; extending from lat. 5° to 6° 40' N., and from long. 119° to 122° 20' E.; area of the group estimated at 1,800 sq. m.; pop. about 120,000. The whole chain consists of about 150 islands, but by far the greater part are uninhabited islets. The principal islands are Sooloo, which gives the name to the group, Tawee, Basilan, and Pengootaran. The island of Cagayan Sooloo, which lies 120 m. N. W. from the main chain, is sometimes included within the Sooloo archipelago, although it does not properly belong to it. Sooloo is about 40 m. long and 12 m. broad; its general aspect is hilly and undulating, and the scenery is picturesque and beautiful; Basilan is 42 m. long and 6 m. broad, has low coasts, and is considerably elevated in the centre; Tawee is about the same in size and appearance as Sooloo; and the others are mostly hilly or elevated. The whole lie within the influence of the monsoons. The thermometer ranges between 75° and 87°. The chief productions consist of teak and sandal wood, rice, tortoise shell, pearls, mother of pearl, fish, tripang, and edible birds' nests. The trade of the group is chiefly centred at the town of Sooloo, or Soung, toward the N. W. end of the island of the same name. The commercial intercourse is carried on principally with Manila, and the products of piratical expeditions have hitherto formed a very important item of trade. The inhabitants are of the Malay race. They write their language, which appears to resemble the Philippine tongue, in the Arabic character. They all profess the Mohammedan religion, but are not very strict in the observance of its rites. It is supposed that they were converted to that faith in the first half of the 15th century, or about 80 years before

the arrival of the Portuguese at the Moluccas. The islands are subject to the sultan of Sooloo, and are governed by numerous petty chiefs. They have the reputation of daring and habitual pirates throughout the archipelago; but their power was broken by a Spanish expedition sent against them in 1851.

SOONGARIA, SONGARIA, DSOONGARIA, or TOHOONGARIA (Chinese, *Thian-shan-yelu*), a region of central Asia, forming part of the Chinese empire, bounded N. by Siberia, E. and S. by Mongolia and Chinese Toorkistan, or Thian-shan-nanlu, S. W. by Independent Toorkistan, and W. by the country of the Kirghee; extending from lat.  $41^{\circ} 30'$  to  $48^{\circ} 40' N.$ , and from long.  $75^{\circ}$  to  $90^{\circ} E.$ ; area estimated at 800,000 sq. m. It is divided into the districts of Ili in the S. W., Koor-Kara-Oosson in the centre, and Tarbagatai in the N. E. The general characteristics of the country are those of an elevated table land surrounded and traversed in various directions by mountain ranges with numerous offsets. The principal ranges are the Altai Aliu, or Golden mountain, called by the Russians the Great Bogodo, and the Celestial mountains. The most important rivers are the Ili and Ir-tish; but Soongaria is especially remarkable for several closed river basins which occur between the Altai and Celestial mountains, and among the various minor ranges of hills, each of which is entirely isolated and contains a salt lake, the receptacle of its drainage. The largest of these basins is that of the river Ili, which, after a course of 300 m. to the westward from its rise in the Celestial mountains, flows into Lake Balkash. The water of Lake Temurtu or Issikul is fresh; the lake is about 100 m. long and 35 m. broad, and its surplus waters flow off through the Tchui to the Kirghee steppe. Salt is particularly abundant, and the other minerals of greatest value are gold, copper, iron, and coal. A great deal of the surface is waste, but many of the valleys have good pastures upon which large herds of cattle are fed by various nomadic tribes; and near Lake Tenggeez extensive forests occur, while in the E. there are many marshy tracts. There are also considerable tracts of arable land upon which different kinds of grain, chiefly millet, rice, and barley, are produced, and tobacco, cotton, and various descriptions of fruit are also grown.—Soon-garia was originally inhabited by a race who differed from the neighboring nations by having fair complexions, blue eyes, and red or sandy hair. These people were conquered by the Toorkomans in the 6th century, who in turn were subdued by the Mongols under Genghis Khan. The Mongols afterward became divided among themselves into several tribes, one of which, the Songares, or Soongarians, whose khan had taken offence, seceded from the others, and subsequently conquered nearly the whole of the elevated region of central Asia W. of Kan-su. About 1720, after the death of their first prince, dissensions arose between rival claimants of the throne, one of whom suc-

ceeded by the aid of a Chinese army; but refusing to acknowledge the supremacy of the Chinese, a long war ensued, terminating in his expulsion and the annexation of Soongaria to China in 1759. The agricultural and mineral resources of the country have since been developed in a considerable degree, many of the nomads have been induced to devote their attention to agriculture, and a spirit of traffic has been excited among all. The policy of the emperor of China toward the people is conciliatory, and their complaints are attentively listened to; but his deputies sometimes commit acts of great oppression.—The adjoining region to the N. W., between the Chinese province and Lake Balkash, is called Russian Soongaria.

SOONNA (Arabic, custom or rule), a collection of oral traditions of the sayings and practices of Mohammed and his immediate successors, the caliphs Abubekr, Omar, and Othman. It is also known under the name of *Hadis*, "Tradition." These traditions were not committed to writing till about A. D. 840, when El Bokhari collected them under the title of *El jami ez-zakhikh*, or the "True Compilation," which has never been printed, though considered the best; several others have since been made, and numerous commentaries written on them. The Soonna deals little in dogma or doctrine, but mainly in practical matters. The Mohammedans generally, except those of Persia and some of the tribes tributary to the shah, who are Sheeahs, recognize the Soonna as of a value second only to that of the Koran, and regard with intense hatred those who deny its validity. The Soonnees greatly outnumber the Sheeahs in Europe, Asia, and Africa, and are often called the orthodox Mohammedans. They are divided into 4 sects, which, though bitterly hostile to each other, agree in all fundamental points.

SOOSOO, or Sousou, the native name of the dolphin of the Ganges, a fresh water cetacean of the genus *platanista* (F. Cuv.). In this, the only described species (*P. Gangetica*, F. Cuv.), the body is from 20 to 24 feet long, thickest in front and gradually tapering to the tail; the head obtuse; the jaws nearly equal, almost straight, slender, compressed at the sides, expanded at the end, and from 3 to 4 feet long; the teeth are  $\frac{3\frac{1}{2}}{3\frac{1}{2}}-\frac{3\frac{1}{2}}{3\frac{1}{2}}$ , conical, projecting from the gums, largest, nearest together, and most curved in front, interlocking in the 2 jaws, and laterally near together in the lower jaw; the symphysis very long; the blow-hole a longitudinal fissure, an unusual form; eyes very small, shining black, deeply sunk, and 4 inches above the angle of the mouth; auditory foramen open but small; the pectorals fan-shaped,  $1\frac{1}{2}$  feet long and 1 foot broad posteriorly; dorsal much depressed and nearest the tail; caudal  $2\frac{1}{2}$  feet wide and feebly notched. The color is shining pearly gray, with a few lighter colored spots; the fat under the skin is highly prized by the Hindoos as an external application in painful diseases; the flesh is like lean beef, and

is rarely if ever eaten. It is carnivorous, feeding principally on fish, in the pursuit of which it is very active, but at other times is rather slow in its motions. It inhabits the river Ganges as far as the head of navigation, but is most abundant where its numerous mouths open into the sea; it is less strictly fluvial than the dolphin of the Amazon (*inia Boliviensis*).

SOOT, the fine carbonaceous particles carried up from burning fuel and dispersed in the air or deposited upon the walls of chimneys. The substance contains beside carbon numerous products of the distillation of the combustible material, which give to it a value for various economical purposes, some of which are named in the account of LAMPLACK, a variety of soot prepared from oleaginous or resinous matters. Ordinary soot is obtained from the sweeping of chimneys, and is of two sorts, one derived from wood and the other from bituminous coal fires. Both make valuable manures, and the latter is very extensively employed in the east of England, where it produces, when applied at the rate of 15 to 30 bushels to the acre, most luxuriant crops of wheat and other grain. It is collected in London to the amount of over 1,000,000 bushels annually, and is sold at the rate of about 5*d.* per bushel. The following is given as the composition of a sample analyzed by Mr. Solly:

Combustible matter, or charcoal.....	671
Salts of ammonia.....	126
Salts of potash and soda.....	24
Oxide of iron.....	50
Silica.....	65
Alumina.....	31
Sulphate of lime.....	31
Carbonate of magnesia.....	2

Total ..... 1,000

Its active properties are in great part due to the ammoniacal salts, which are the sulphate and hydrochlorate, absorbed by the fine particles of carbon, and in the most favorable condition to be given out as required by the growing plants. It is spread upon the land in the spring in the manner of sowing wheat, and its beneficial effects are increased by mixing with it a portion of common salt. Sir H. Davy found the liquid produced by dissolving 6 quarts of soot in a hogshead of water an excellent mixture for watering garden and pot plants. Wood soot was carefully analyzed by H. Braconnot with the following result:

Urine or geline.....	302.0
Azotized matter, soluble in water but not in alcohol..	200.0
Carbonate of lime and traces of carbonate of magnesia	146.6
Water.....	125.0
Acetate of lime.....	56.5
Sulphate of lime.....	50.0
Acetate of potash.....	41.0
Carbonaceous matter insoluble in alkalies.....	8.5
Ferro-phosphate of lime.....	15.0
Silica.....	9.5
Acetate of magnesia.....	5.3
Asboline (a peculiar acid and bitter principle) about	5.0
Chloride of potassium.....	3.6
Acetate of ammonia about.....	2.0
Acetate of iron.....	trace

Total..... 1,000.0

From the knowledge now possessed of the products of the destructive distillation of combusti-

ble matters, a portion of the carbonaceous and azotized ingredients presented in these analyses might be obtained in the forms of the hydrocarbons, creosote, capnomor, &c. The azotized matter, as also the soot itself, yields oil by distillation.—Soot in the form of tincture was formerly a favorite medicine with the Scotch physicians, who prescribed it as a tonic and antispasmodic. At present its use in medicine is as an external remedy in the form of decoction or ointment, the one made by boiling two handfuls of soot in a pint of water for half an hour and filtering, the other by rubbing up a drachm of finely powdered soot with an ounce of lard. Both prove efficient applications in various cancerous and ulcerous affections, although the chimney sweep's or soot cancer is a well known affection in England. In case of profuse discharge after severe and extensive burns, lint soaked in the decoction and applied has reduced this in a surprising manner. Soot has strong antiseptic properties, and like charcoal effectually deodorizes foul exhalations.

SOOTHISAYER, an orthopterous insect of the group of graspers (*raptoria*), and genus *mantis* (Fabr.). In the best known species (*M. religiosa*, Linn.) the head is triangular, the eyes large, the prothorax very long, and the body narrowed and lengthened; the anterior feet are armed with hooks and spines, and the shanks are capable of being doubled upon the under side of the thigh. When at rest it sits upon the 4 posterior legs, with the head and prothorax nearly erect, and the anterior feet folded backward; from this singular attitude it is called the praying mantis or soothsayer (*prie Dieu* of the French). They are slow in their motions, waiting on the branches of trees and shrubs for some insect to pass within their reach, when they seize and hold it with the anterior feet, and tear it to pieces. They are voracious, sometimes preying upon each other; they are beneficial to man in destroying caterpillars and other insects injurious to vegetation. The eggs are deposited in 2 long rows, protected by a parchment-like envelope, and attached to the stalk of a plant; the nymph is as voracious as the perfect insect, from which it differs principally in the less developed wings. They are most abundant in the tropical regions of Africa, South America, and India, but are found in the warmer parts of North America, Europe, and Australia. In the south of France it was once a popular belief that this insect, if spoken to, would point out the way to a lost child, and in central and S. Africa it is still regarded with veneration.

SOPHIA, or TRADIRZA, a town of European Turkey, in Bulgaria, situated on the Bogana, a tributary of the Isker, near the N. foot of the Balkan mountains, and on the great road from Constantinople to Belgrade, 310 m. W. N. W. from the former and 250 m. S. E. from the latter; pop. about 50,000. It stands in an extensive plain, and the streets are narrow, crooked, and dirty, and the houses generally of mean

appearance. Sophia has a castle, several Christian churches, numerous mosques, elegant public baths, bazaars, and khans. It is the see of both Greek and Roman Catholic bishops. The manufactures consist of cloth, leather, and tobacco. Sophia was founded by the emperor Justinian on the site of the more ancient town of Sardica, or Upper Sardica, an important place of Upper Mœsia celebrated for an ecclesiastical council held there in 347. It was conquered by the Turks in 1882.

**SOPHIST** (Gr. *σοφιστής*, a wise or shrewd man), in Greek antiquity, a term originally applied to every one distinguished for intellectual accomplishments, as Solon the lawgiver, Thamyris the bard, Isocrates the rhetorician, the 7 sages, and Pythagoras, Socrates, Plato, and other philosophers. More particularly, it designated a profession of rhetorical teachers in the age of Socrates. In the Athenian republic, where every citizen was obliged to plead his own cause before the dicastery, and could hardly exert political influence without the talent of fluent speaking, rhetoric came to hold a foremost place in education. Among the sophists or professors of this art, in the latter part of the 5th century B. C., were men of eminent abilities, masters of the learning of the age, with treasures of accumulated thought on scientific, moral, and political subjects, capable of impressive composition and speech, and in much request for training the youth of rich and noble families. The more successful of them acquired wealth, enjoyed the highest personal distinction, and travelled from city to city with general admiration, their arrival being celebrated as a festival, while hearers and pupils flocked to them in crowds. Grote assigns two reasons for the disrepute which came to be attached to the profession: first, the natural distrust or envy which mingles with the admiration felt by the ignorant for superior intellect, a temper, he suggests, which made charges of magic so common in the middle ages; and secondly, the fact that the sophists taught for pay, against which practice both Socrates and Plato cherished a vehement repugnance, regarding it as nothing less than servitude, and as thoroughly dishonoring the relation between teacher and pupil. The hostile representations of Plato, which have been repeated by most modern historians of philosophy, may be explained also by the difference between his point of view and theirs; he being a speculative reformer, dissenting on some fundamental points from society as established, and admitting the unfitness and distaste of his disciples for practical life; while the sophist's direct business was neither with social reform nor ethical theory, but only to fit young Athenians for active and honorable careers according to the existing social conditions. They have been charged, therefore, with a denial or renunciation of true science, with esteeming all knowledge as subjective and true only for the individual, with aiming to show the unimpor-

tance of truth by making the worse appear the better reason, and by speaking with equal plausibility for and against the same proposition, and with thus corrupting the public virtue. But the sophists had in common, not a system, but an art, and wrought variously in the interest of intellectual culture and achievements, in an epoch when traditional faith had declined, and before Socrates had given a positive tendency to philosophy. The teachers denounced by Plato as sophists were Protagoras of Abdera, Gorgias of Leontini, Polus of Agrigentum, Hippias of Elis, Prodicus of Ceos, Thrasymachus of Chalcedon, and Euthydemus and Dionysodorus of Chios.—A full treatment of the subject can be found in Grote's "History of Greece," chap. lxviii. Dr. Whewell's "Platonic Dialogues for English Readers," vol. ii. (London, 1861), contains the anti-sophist dialogues.

**SOPHOCLES**, a Greek tragic poet, born in the Attic village of Colonus in 496 or 495 B. C., died probably in 406. He was about 30 years younger than Æschylus, and 15 years older than Euripides. Having gained the prize of a garland both in music and gymnastics, he was in his 16th year selected for his beauty and musical skill to lead, naked, anointed, and with lyre in hand, the chorus which danced and sang around the trophy in the celebration of the victory of Salamis. In 468 he first came forward as a competitor in a dramatic contest, having for his rival the veteran Æschylus. The representation was at the great Dionysia, presided over by the first archon; the judges were Cimon and his colleagues who had just returned from the conquest of Skyros, bringing with them the bones of Theseus; the play presented by Sophocles was probably the "Triptolemus," celebrating the Eleusinian hero as a patriot and civilizer; the public interest and expectation were strongly excited; and the first prize, which for a whole generation had belonged to Æschylus, was now awarded to his youthful rival. From this time to the first triumph of Euripides in 441 no particulars of his life are known, though he is stated to have produced 81 plays and to have held the ascendancy on the Athenian stage. In 440 "Antigone," his earliest extant drama, gained the prize, and so delighted the Athenians by its reflections on public affairs that they elected him one of the 10 *strategi* for the ensuing year. He engaged as the colleague of Pericles in the Samian expedition, but neither achieved nor sought military reputation, and amid the occupations of war was able to indulge his cheerful temper, voluptuous tastes, and habits of tranquil contemplation. Donaldson argues that he was a personal and political friend of Pericles, and it is certain that he enjoyed familiar intercourse with Herodotus, in whose honor he composed a poem. Ruhnken supposes that it was not the poet, but an orator of the same name, who after the destruction of the Sicilian army in 413 favored the oligarchical movement and was appointed one of the 10 *προβουλοι*.

His poems demonstrate his patriotic enthusiasm, and he refused repeated invitations to leave Athens and reside at foreign courts; but he seems to have been content with the career of a successful dramatist, and to have taken little part in public affairs. During the 34 years following the success of "Antigone" he produced 81 dramas, contending with Æschylus, Euripides, Chœrilus, Aristias, Agathon, and his own son Iophon, gaining the first prize 20 or 24 times, the second frequently, but never the third. A comparison of dates shows that he brought out a tetralogy (not always including the satyric drama) at first once in 3 or 4 years, and afterward at least once in 2 years, the era of the Peloponnesian war being the most prolific. He had two sons, Iophon, his lawful heir, by Nicostrate, a free Athenian woman, and Ariston, by Theoris of Sicyon. He had the greatest affection for Sophocles "the younger," son of Ariston; and Iophon, apprehending his intention to transfer to this grandson a part of his property, summoned him before the *phratries* on a charge of senility and incapacity to manage his affairs. In defence Sophocles only recited a passage from the "Edipus at Colonus," which he had just composed, and which so impressed the judges that the charge was at once dismissed, and the son rebuked. At an advanced age he filled the office of priest to the native hero Ilalon. There is no certain authority for either of the accounts of his death, that he was choked by a grape, that he sustained his voice so long in publicly reading the "Antigone" as to lose his breath and life together, or that he died of joy on obtaining a dramatic victory. It has been said that he combined all the qualities which, in the judgment of a Greek, would make up a perfect character: beauty and symmetry of person, mastery alike in the two departments of music and gymnastics, spontaneity of genius and faultlessness of taste, constitutional repose, a habit of tranquil meditation, a ready wit, and an amiable demeanor. Even the comic poets treat him in general with respectful reserve, though insinuating his love of gain and sensual indulgences. A melodious voice alone was wanting to him, and he was therefore obliged to depart from the established practice for the dramatist to act a part in his own pieces. As a poet, he is placed by the universal consent of ancient and modern critics at the head of the Greek drama. His tragedies hold the just mean between the vague and solemn sublimity of Æschylus and the familiar scenes and rhetorical pathos of Euripides, presenting the characters of men worthy of sympathy and admiration, while the former delighted in religious themes fit to inspire awe, and the latter abounds in unpoetical disquisition and immoral vehemence of passion. He illustrates the age of Pericles, intervening between that of the heroes of Marathon and Salamis and that of the sophists. "His tragedies," says K. O. Müller, "are a beautiful flower of

Attic genius, which could only have sprung up on the boundary line between two ages differing widely in their opinions and mode of thinking. He possessed in perfection that free Attic training which rests upon an unprejudiced observation of human affairs; his thoughts had entire freedom, and the power of mastering outward impressions; yet with all this, he admits a something deeply rooted in our conscience, which cannot be moved and must not be touched, and which a voice from within warns us not to bring into the whirlpool of speculation. He is, of all the Greeks, at once the most pious and the most enlightened; and, hitting upon the right mean between adherence and opposition to the traditional belief of his country, has always the skill to call attention to that side of his religion which must have produced devotional feelings even in a reflecting and educated mind of that time." From the beauty and sweetness of his style he was called the Attic Homer. In purity of diction, smoothness of rhythm, and harmonious development of all the momenta of the action, he was unrivalled. He introduced important changes in the form and mechanism of the Greek drama, developing the art to its highest perfection. Excepting in the trilogy of the "Orestia," Æschylus had never allowed more than 2 actors to appear upon the stage at once; but all the extant plays of Sophocles would require 3 or 4 actors to represent them. The dialogue thus gained much in variety and energy, and gave a fuller exhibition of the passions and struggles of the soul, it being the office of the tritagonist to oppose and gainsay the first person, and of the deuteragonist by friendly sympathy to draw from him his gentler feelings and more secret thoughts. This change, says Müller, accomplished "all that was necessary to variety and mobility of action, without sacrificing that simplicity and clearness which, in the good ages of antiquity, were always held to be the most essential qualities." The part which fell to the chorus was also considerably diminished by him, and thus the continuity of the action was made closer, and the interest and movement of the piece centred in the actors on the stage. But he seems to have sought by the beauty of his choral odes to compensate for their brevity, and made them masterpieces of lyrical grace and sweetness. The same tendency to simplicity of structure and unity of development appears in his custom of bringing forward at the festivals, not 3 tragedies and a satyric drama on the same subject, as Æschylus had done, but 4 entirely distinct plays, each complete in itself. His plots, therefore, instead of comprehending all the complicated destinies of families and tribes, were formed with reference to one great action, to which the whole delineation of character and passion contributed. —Of the 113 dramas attributed to Sophocles by Aristophanes the grammarian, only 7 have been preserved, to which Müller assigns the

following chronological order: "Antigone," "Electra," "Trachinian Women," "King Edipus," "Ajax," "Philoctetes," and "Edipus at Colonus." They all belong to the later period of his life, reveal his art in its full maturity, and several of them were esteemed by the ancients among his greatest works. The "Edipus at Colonus" was first brought out by his grandson after his death. There are also fragments and titles of his lost plays.—The *editio princeps* of Sophocles is that of Aldus (1502). The text in the edition of Brunck (2 vols., Strasbourg, 1786) has been the basis of that in all later editions, among the best of which are those of Erfurt and Hermann (7 vols., Leipsic, 1809–25), Dindorf (Leipsic, 1830), and Wunder (2 vols., Gotha and Erfurt, 1831–46). Welcker in his *Griechische Tragödien* has collected all the fragments, and suggested the probable outlines of some of the lost plays. The best translations are, in German, by Solger (1808), Donner (1842), and Fritz (1843); in French, by Artaud (1827), Faguet (1849), and Guiard (1852); and in English, in prose, by Adams (1729) and Buckley (in Bohn's "Classical Library," 1849), in verse by Franklin (1758–9), Potter (1788), and Dale (1824). The principal ancient authority for the biography of Sophocles is an anonymous compilation by an Alexandrian Greek. Important critical treatises are Schöll's *Sophokles, sein Leben und Wirken* (1842), Lessing's unfinished *Leben des Sophokles*, and chapters in Schlegel's "Dramatic Art and Criticism" (English translation, London, 1846), and in Müller's "History of the Literature of Ancient Greece" (English translation, London, 1858).

SOPHONISBA. See MASINISSA.

SOPRANO (It.), the treble or highest species of female voice, extending generally from C above the base clef note to A, B, or C in alt., and sometimes higher.

SORACTE (now *Monte di S. Oreste*), a mountain of ancient Etruria, in the territory of the Falisci, visible and about 26 m. N. from Rome. It is an offset from the Apennines, separated from the general chain by the valley of the Tiber, and rises in an abrupt mass 2,140 feet above the surrounding table land. It was consecrated to Apollo, who had a temple on its summit where the present monastery of S. Silvestro stands, and was worshipped there with peculiar rites.

SORBONNE, THE, a college of the university of Paris, founded and moderately endowed in 1252 by Robert de Sorbon, chaplain to St. Louis, to furnish gratuitous instruction in theology to the poor students of Paris. The members of the college, about 30 in number, were divided into fellows and commoners. The fellows were usually doctors in theology, and were admitted after a triple scrutiny and the gratuitous delivery of a course of lectures on philosophy. They received their maintenance in the seminary building, and if their income from any other source did not reach 40 livres (about \$10) per annum, they received a trifling stipend; if

it exceeded that sum, they paid the amount of that stipend. The commoners were required to be bachelors in theology, and were maintained in the college, but had no voice in its government and no stipendiary allowance. They were subjected to a triple scrutiny, and were required to defend a thesis. Within a century from its organization the college was largely endowed and had many distinguished members. The doctors of the Sorbonne were regarded during the 14th, 15th, 16th, and 17th centuries as the most eminent theologians of the Roman Catholic church, and were often called upon to decide important theological questions which convulsed Europe. They advised on the claims of contending aspirants to the papacy, opposed the reformation, defended the liberties of the Gallican church against the papal supremacy, were divided at first on the question of Jansenism, and finally declared themselves against the bull *Unigenitus*, thereby losing many of their members. The first printing press in Paris was established in their college. Their buildings having become much dilapidated, Cardinal Richelieu rebuilt them in the early part of the 17th century, and erected a fine chapel on the site of their preparatory school. During the 18th century the Sorbonne greatly declined from its previous reputation, and in 1789 it was suppressed, and has never been restored. Its buildings are now occupied by the *académie universitaire* of Paris.

SOREL, AGNES. See AGNES SOREL.

SORGHUM, a species of grass commonly known as the Indian millet, or *sorghum vulgare* (*andropogon sorghum* of Stendel), the botanical character and relations of which are given in the article MILLET. The species includes at least 4 varieties, viz., the broom corn, imphée, durra, and *S. sucré*, which appear to be merely modified forms, exchanging their properties with each other when growing near together, and also producing new hybrids, thus resembling the varieties of Indian corn. From a remote period sorghum has been cultivated in Egypt and India as a forage plant and as food for animals and man. Attention was first called to the plants in Europe by Prof. Pietro Arduino of Florence, who in 1786 attempted to introduce the imphée from Caffraria into Italy. In 1851 seeds were sent to Paris by the French consul at Shanghai, all which, it is said, died excepting one, and from this alone have been produced all the plants in Europe and America. Mr. Leonard Wray of England about the same time called attention to the varieties of the plant, at least 16 in number, cultivated by the Zooloo Caffres, for the sake of the saccharine juice, which they consumed by chewing the stalks, without undertaking to convert it into sugar. In 1856 the *sucré* variety, or Chinese sugar cane, began to attract attention in the United States, the patent office department at Washington introducing some seeds from France; and the same being done upon a much larger scale by Mr. Orange Judd of New

York, editor of the "American Agriculturist," who imported, at an expense of \$1 per lb., 1,600-lbs. of seed, and distributed over 25,000 separate parcels to the subscribers of his journal in all parts of the United States. The following are the chief conclusions of interest resulting from its culture. It thrives wherever Indian corn will grow, and even upon lighter soils than are suited to that crop; but it cannot be depended upon for ripening its seeds N. of lat. 41°. It may be cultivated in the same manner in hills and rows, or, when designed for soiling or dry fodder, be sown broadcast. When fully grown the plant is from 6 to 18 feet high, the stalks 1 to 2 inches in diameter, and the weight of the green crop to the acre from 10 to 40 tons, and the seed from 15 to 60 bushels. For fodder it has not proved so valuable as was anticipated, cattle not always being fond of the stalks, and these sometimes proving injurious to them on account of the large proportion and hardness of the woody fibre. Well trimmed stalks yield about 50 per cent. of their weight of juice; and of this from 5 to 10 gallons, according to the locality, the soil, and the maturity of the canes, make a gallon of sirup. The product of juice to the acre is from 150 to 400 gallons, and this yields from 5 to 9 per cent. of alcohol. Its product of dry saccharine matter, when the plant is well matured, and grown upon a warm, light soil, is from 13 to 16 per cent.; and about  $\frac{1}{10}$  of this has been pronounced well defined crystallized cane sugar, the remainder glucose or grape sugar. The more luxuriant plants from the richest soils are less productive in sugar. Dr. J. Lawrence Smith obtained a much larger proportion of juice and sugar from cane perfectly matured and recently cut, and has given the following table of the composition of the stalk of this plant, of the sugar cane, and of beet root:

Constituents.	Sorghum.	Sugar cane.	Beet root.
Water .....	75.6	72.1	83.5
Sugars .....	12.0	18.0	10.5
Woody fibre and salts .....	12.4	9.9	6.0
Total .....	100.0	100.0	100.0

He found that if the juice were expressed immediately after the stalks were cut, nearly all the sugar, amounting altogether to  $\frac{1}{10}$  of the whole weight of the stalks, might be secured as crystallized sugar; but that after cutting the sugar rapidly assumed the glucose character, the change proceeding from the cut or bruised surfaces. The method he recommended of preparing the sugar was to heat the fresh juice rapidly to 120°, then add for each gallon 8 ounces of lime slaked with 5 or 6 times its weight of water, and raise the temperature to 200°. It is then to be filtered, carbonic acid passed through the mixture, again filtered, and evaporated to proper consistency for crystallization, the heat at no time exceeding 215°. If each filtering is through well washed animal

charcoal, the sirup may be made very clear, and the sugar will be perfectly white. The observations of Dr. Smith respecting the amount of cane sugar contained in the sorghum agree with those of M. Leplay, who has experimented in France upon large quantities of the plant under different conditions. He finds that before flowering the plant contains little sugar, but that this is developed as the grain approaches maturity, and is chiefly cane sugar. Dr. Hayes of Boston, however, asserts, from his microscopic and chemical examinations of the stalks of the sorghum, and also of samples of sugar prepared from it, that the saccharine matter of the canes cultivated in this country is purely glucose in a semi-fluid form, becoming crystalline several months after extraction; and though the crystals resemble those of cane sugar, the product itself remains a higher grade of dry fruit sugar, the sweetening quality of which is probably not more than one third that of cane sugar. He admits, however, that the sorghum when grown in Algeria secretes cane sugar, notwithstanding that the sweet grasses usually yield fruit sugar only. The production of sugar has not attained much importance in the United States, but the plant continues to be cultivated to a great and rapidly increasing extent in the middle and western states, especially for the sake of the sirup, which is readily obtained and is largely consumed in the place of the molasses of the common sugar cane.—A work on the sorghum was published in New York in 1857, entitled "Sorgho and Imphee, the Chinese and African Sugar Canes," by Henry S. Olcott.

SORIA, a N. province of Spain, in Old Castile, bounded N. by Burgos and Logroño, E. by Saragossa, S. by Guadalajara, and W. by Segovia and Burgos; area, 3,831 sq. m.; pop. in 1857, 147,468. The province is surrounded on 3 sides by mountains, and the surface is elevated, rugged, and broken by many valleys and glens. The Douro rises in the mountains near the N. boundary, and flows first S. and then W. into the province of Burgos. There are large forests of pine, oak, and beech. In some parts of the province the field labor is done by women. The roads of Soria are mere tracks only practicable for mules, and it has in consequence but little communication with the surrounding provinces.—SORIA, the capital, is situated on an irregular eminence on the right bank of the Douro, 113 m. N. E. from Madrid; pop. 5,400. It is surrounded by walls built in the 13th century. The most important manufactures are earthenware, leather, and flour. The site of the ancient Numantia is supposed to have been 4 m. from Soria, but no traces of it remain. Ney sacked the town in 1808.

SORREL, hardy, perennial-rooted, herbaceous plants of the genus *rumez* (Linn.) and natural order *polygonaceae*. The dock sorrel (*R. acetosa*), a native of Europe, has been introduced into the garden there on account of its culinary value, being employed as a salad and



pot herb, and in cooling drinks. Its root is long and tapering, of an astringent quality; its stem erect, cylindrical, striated, simple, leafy, 1 to 2 feet high; its leaves oblong, ovate, and sagittate, smooth, of powerful and agreeable acid; its flowers diceious in branched panicles, the sepals 6 and of a greenish color. There are several distinct varieties, differing from each other in the texture and acidity of their leaves, and requiring a rich and well manured soil. It is seldom cultivated in the United States, being represented by the sheep sorrel (*R. acetosella*, Linn.), a smaller plant with lanceolate-hastate leaves, the flowers in paniculate racemes of a crimson color. It is adventitious from abroad, and in some soils proves an exceedingly troublesome weed, the application of alkalies being needed to destroy it.—The mountain sorrel (*Oxyria digyna*) is a humble alpine perennial, with very acid, kidney-shaped, long-petioled, radical leaves, and small greenish flowers; it was also formerly cultivated as a salad. It is found in Europe and in the northern parts of the United States.—The wood sorrels (*Oxalidaceae*) are also plants with sour juice, compound leaves, symmetrical 5-parted flowers, with 10 stamens, an imbricated calyx and petals convolute in estivation, the pod 5-celled and several-seeded, the seeds abounding in albumen. The common wood sorrel (*Oxalis acetosella*, Linn.) is a low stemless plant, with leaves and flower stem issuing from a sort of bulb or scaly rhizome; the flowers have 5 white petals, slightly tinted with reddish veins, the leaves consisting of 3 broadly obovate leaflets. It is common to Europe and North America, being found in deep cold woods. It is in some repute abroad as a salad, and medically employed in infusions for the treatment of fevers. The violet wood sorrel (*O. violacea*, Linn.) has a little scaly bulb, very broadly obovate leaves, scapes bearing several violet-petalled flowers of considerable size, blossoming in May and June, and found in rich rocky woods from New England southward. A very common weed introduced from Europe is the yellow wood sorrel (*O. stricta*, Linn.), with leafy stems, which are at first erect, but afterward branching, small yellow-petalled flowers, and erect pods. It occurs by roadsides and in gardens, assuming a variety of forms as the soil is barren or fertile, and blossoms throughout the season. There are some other species at the Cape of Good Hope, which have been introduced into the greenhouse on account of their beauty of leaves and flowers, and others from various parts of the world employed as food, such as the *oca* of South America (*O. crenata*, Jacquin), with tuberous roots, which after exposure to the light become sweet and are eaten like the potato; and the *O. Deppei* has fleshy roots, free from acidity, which contain mucilage similar to salep. The 4-leaved wood sorrel (*O. tetraphylla*), a native of Mexico, has likewise fleshy roots, which, like those of the *O. esculenta* and *crassicaulis*, are used for food. The wood sorrels are natives of all

the hotter and temperate parts of the world, and their chief quality is a strong acidity caused by the presence of oxalic acid contained in them. (See OXALIC ACID.)

SORRENTO (anc. *Surrentum*), a city of Naples, Italy, in the district of Castellamare, on a promontory on the S. side of the gulf, and about 16 m. S. S. E. from the city of Naples; pop. about 10,000. It is the seat of an archbishop, and has a fine cathedral and 6 other churches, and interesting ruins. There are in the vicinity several curious grottoes and caves. The town has some manufactories of silk, and considerable trade in silk, oranges, and other fruits, oil, and wine. It was at one time famous for its silver wine goblets. The mountains defend it from the S. and W. winds, and the climate is delightful. It was founded by a colony from Cuma, and became a Roman colony under Augustus. In A. D. 79 it suffered severely from an eruption of Vesuvius. It is the birthplace of Tasso.

SOTO, DE. See DE SOTO.

SOUBISE, BENJAMIN DE ROHAN, seigneur de, a French soldier, born about 1589, died in 1641. He was the second son of René II. de Rohan by Catharine of Parthenay, the heiress of the house of Soubise, and the brother of Henri de Rohan, the chief of the French Protestants, and first served in Holland under Maurice of Nassau. When the hostilities with the Catholics broke out in 1621, he was appointed by the Protestant assembly held at Rochelle to the command of Poitou, Brittany, and Anjou; and after the other chiefs laid down their arms, he boldly defended St. Jean d'Angely against the royal army, but was obliged to surrender at the end of a month. Attempting to renew the war during the winter of 1622, he was several times defeated, and repaired to England in the hope of obtaining help from James I., but failed. In 1625, being master of the islands of Ré and Oléron, he by stratagem gained possession of a royal squadron of 15 sail at the mouth of the Blavet, and after keeping at bay for several weeks the combined fleet of France and Holland, was conquered by Admiral Montmorency, Sept. 15, and driven from the island of Oléron. Returning again to England, he prevailed upon Charles I. to interfere in behalf of the French Protestants, which brought about the hollow peace of April 6, 1626, Soubise receiving the titles of duke and peer. When Richelieu in 1627 besieged Rochelle, Soubise took part in the fruitless attempt made by the English fleet under Buckingham to relieve that city; and when it was taken, although included in the edict of pacification of 1629, he declined availing himself of its terms, and spent his later years in England.—CHARLES DE ROHAN, prince de, marshal of France, born in 1715, died July 4, 1787. He was the intimate friend of Louis XV., and rose to eminence through his favor, though a man of small talents. Aide-de-camp to the king from 1741 to 1748, and governor of Flan-

ders and Hainault in 1751, he was placed in command of an army of 24,000 men at the beginning of the 7 years' war. Being successful in his first operations on the Rhine, he crossed that river, joined the imperial troops, and advanced to Gotha, where he was surprised and shamefully put to flight by Gen. Seydlitz at the head of 1,500 Prussian troops. A few weeks later, Nov. 5, 1757, he was ignominiously defeated at Rossbach by Frederic the Great. This detracted nothing from his favor; he was appointed minister of war, and the following year had another chief command. Owing to the military skill of the duke de Broglie, who had been associated with him, the French army, successful at Sondershausen and Lützelberg, took possession of the Hessian electorate, and Soubise was rewarded by being made a marshal. During the campaign of 1761, Broglie, defeated at Fillinghausen, put the responsibility upon his colleague; a bitter quarrel arose; but through Mme. de Pompadour's influence, Broglie was exiled to his estate, while Soubise remained in full favor. In 1762, by following the advice of Marshal d'Estrées, he won another success at Johannisberg; and repairing to the court, where he paid homage in turn to Mme. de Pompadour and Mme. Dubarry, he continued to be a favorite of the king. On the death of his master he was the only one among the courtiers who accompanied his remains to their resting place at St. Denis. In him the family of Rohan-Soubise became extinct.

SOUGITA GEMPAK. See GEMPAK.

SOULÉ, JOSHUA, D.D., an American clergyman, senior bishop of the Methodist Episcopal church, South, born in Bristol, Me., Aug. 1, 1781. He was licensed to preach in 1798, ordained elder in 1802, and in 1804 appointed presiding elder of the Maine district, which embraced 12 circuits and one station, within a circumference of 1,200 miles. In 1808 he attended the general conference in Baltimore, at which the plan of a delegated general conference was adopted, the constitution of which, as it now appears in the "Discipline," was drawn up by Mr. Soule. After presiding over various other districts in Maine and Massachusetts, he was in 1816 elected by the general conference book agent and editor of the "Methodist Magazine;" and in 1820 he was elected to the episcopate, but declined ordination, not being willing to exercise the functions of a bishop if the power of electing the presiding elders was invested in the annual conference, as was then proposed by the general conference. In 1820 he was stationed in the city of New York; in 1821 he was preacher in charge of the station in that city, and in 1822-'8 of the Baltimore city station. In 1824, the general conference being held in Baltimore, he was reelected to the episcopate; and as the election of presiding elders by the annual conferences never prevailed, and the entire project was now abandoned, he consented to ordination. The general conference of 1840 appointed him its representative

to the British Wesleyan Methodist conference in 1842; and after fulfilling that appointment, he travelled extensively in the British islands and in France. At the decease of Bishop Roberts, March 28, 1843, he became the senior bishop of the Methodist Episcopal church. At the general conference held in New York in 1844 he took a decided stand against the action of the majority, who wished Bishop Andrew to desist from the exercise of his episcopal functions because he had become by marriage connected with slavery. This case having resulted in the division of the church, Bishop Soule adhered to the southern portion, and changed his place of residence from Lebanon, O., to Nashville, Tenn. In 1853-'4 he made an episcopal tour in California, and has since withdrawn from the active duties of his office in consequence of impaired health, though he still preached occasionally in 1859.

SOULÉ, PIERRE, an American statesman, of French extraction, born in Castillon, department of Arige, in the early part of the present century. He was the son of a lieutenant-general in the republican armies, who afterward filled the office of judge, previously hereditary in the family. Being destined for the church, he was sent in 1816 to the Jesuits' college at Toulouse; but wearying of theological studies, he went to complete his education at Bordeaux, and soon became implicated in a plot against the Bourbons. He took refuge in a village of Navarre, and, after following for a year the occupation of a shepherd, was permitted to return to Bordeaux. Soon afterward he repaired to Paris, was admitted as an advocate at the bar, and, in conjunction with Barthélemy and Méry, edited *Le Nain*, a journal of ultra liberal sentiments. A bitter attack upon the ministry brought him under the notice of the authorities, and after a trial at which he defended himself with boldness and skill, he was sentenced to pay a fine of 10,000 francs and to be imprisoned in St. Pélagie. Having succeeded in making his escape, he embarked in 1825 for America, and in the latter part of the year established himself in New Orleans. He applied himself assiduously to the study of English, passed his examination for the bar in that language, and soon rose to great eminence in his profession. In 1847 he was elected U. S. senator from Louisiana to fill a vacancy, and in 1849 was reelected for a full term of 6 years. As a public man he took extreme southern ground, and was a frequent participant in the debates which preceded the adoption of the compromise measures of 1850. Upon the accession of Mr. Pierce to the presidency in 1853, he was appointed minister to Spain, and soon after his arrival became involved in a quarrel with M. Turgot, the French ambassador, whom he severely wounded in a duel. He subsequently lent his influence to the revolutionary outbreak of Aug. 1854, in Madrid, and was led by his peculiar views on the subject of the acquisition of Cuba by the United States to exceed the instructions

of his government, and to withhold from the knowledge of the department of state a treaty for reciprocity of trade between the United States and Cuba which had been concluded by the American secretary of legation at Madrid during the temporary absence of the minister. He participated in the conference of American diplomatists at Ostend in the summer of 1854, and was obliged to proceed thither by sea, the French government refusing to give him a passport to travel through France. In that conference he is believed to have exercised a great influence in securing the adoption by Messrs. Buchanan and Mason, the other members, of the declaration that Cuba must be acquired by the United States as not only necessary to the political power of the republic, but as especially indispensable to the welfare and security of the slaveholding portion of the Union. He returned to the United States in 1855, and has since taken but little part in public affairs. He is understood to have been opposed to the passage of an ordinance of secession by the state of Louisiana.

SOULIÉ, MELOHIOU FRÉDÉRIC, a French dramatist and novelist, born at Foix, Ariège, in 1800, died at Bièvre, near Paris, Sept. 22, 1847. He received his collegiate education at Nantes and Poitiers, studied law at Paris, and was expelled from the school there on account of his political opinions. He published in 1824 a collection of miscellaneous poems, under the title of *Amours Français*, which passed unnoticed. He then became the foreman of an upholsterer, but devoted his leisure hours to his literary pursuits. In 1828, through the influence of Jules Janin, his drama, *Roméo et Juliette*, was performed at the Odéon, and proved successful, whereupon he gave up his industrial employment. *Christine à Fontainebleau*, a 5-act drama, proved almost a failure in 1829; his *Nobles et bourgeois* was still more unfortunate, being hissed off the stage on the first night; *Lusigny* was at least listened to for about a month; and finally came *Clotilde* in 1832, which called forth volleys of applause and criticism. He now turned his attention to novel writing, and his first work, *Les deux cadavres* (1832), was very popular. It was followed in rapid succession by *Le conseiller d'état*, *Le magnétiseur* (1834), *Les romans historiques du Languedoc* (1834-'6), *Diane et Louise* (1836, one of the most impressive stories ever written), *L'homme de lettres* (1838), *Le maître d'école* (1839), *Si jeunesse savait, si vieillesse pouvait* (1842), *Les mémoires du diable* (1844, a powerful picture of society), which were originally published in the *Journal des débats*, and many others. He continued also to write occasionally for the stage; among his later plays, his dramatization of the chief episode in his *Diane et Louise*, under the title of *Diane de Chivry*, and *La closerie des genêts* (1846), had an unparalleled run. The original editions of his novels amounted to over 150 volumes, which are now reprinting in a more compact form, and already fill about 30 thick vols. 12mo.

SOULOUQUE, FAUSTIN, a Haytian general and emperor under the title of Faustin I., born in the southern part of St. Domingo in 1789. By birth a slave, he became free by the decree of 1790, took part in the negro insurrection against the French in 1803, served as captain under Boyer in 1820, as colonel under Hérard in 1844, as brigadier-general under Guerrier in 1845, and was commander of a division at the time of the death of Riché in 1846. While the generals Souffran and Paul were disputing and plotting for the succession, the senate unexpectedly elected Soulouque to the presidency, March 1, 1847. By his antecedents he belonged to the party of the mulattoes, but, jealous of their power, he began to attach the blacks to his interest, and to pursue a system of terror toward the citizens. The number of citizens was decimated in 1848 by confiscations, proscriptions, and executions. He also renewed without success the attempts of his predecessors to subjugate the republic of St. Domingo. In 1849 he caused the restoration of the empire, ostensibly by the will of the people and the action of the chambers, was almost unanimously chosen emperor (Aug. 26), assumed the title of Faustin I., surrounded himself with a numerous court, founded a military and civil order and an order of nobility, and issued a constitution, reserving to himself, however, the right at any juncture to rule as he pleased. His caprices furnished abundant themes of ridicule to foreign journals. He was crowned with great pomp, April 18, 1852, imitating on the occasion the ceremonial at the coronation of Napoleon I. In 1855 he repeated his attempt to conquer the neighboring republic, and took the field with an army of 10,000 men, but was so completely defeated by Santana that he barely escaped capture, and his treasure and throne fell into the hands of the enemy. A campaign in the following year also terminated with his defeat. A commercial crisis in 1858 increased the general discontent, and Gen. Geffrard, an enterprising mulatto, led a rebellion, and was recognized as president of the republic of Hayti by the civil and military officials. Soulouque took refuge (Jan. 15, 1859) on board a British frigate, which bore him with his wife and child to Jamaica, where he has since remained.

SOULT, NICOLAS JEAN DE DIEU, duke of Dalmatia, a French soldier and statesman, born at St. Amans-la-Bastide, now in the department of Tarn, March 29, 1769, died there, Nov. 26, 1852. He entered the army when only 16, distinguished himself by good conduct, and soon received a lieutenant's commission. When the revolutionary wars commenced, he rose very rapidly through daring exploits and military talent. A captain in 1793, he passed within a single year, 1794, through the grades of chief of battalion and colonel to be promoted to a brigadier-generalship, as the reward of his services at Fleurus and during the conquest of Belgium, under Jourdan. In 1796 he participated in the victory won by the same general

at Altenkirchen, and was also instrumental in the success of Moreau at Friedberg. In 1799, having with but 5,000 soldiers victoriously opposed 30,000 Austrians at Liebingen, he was appointed general of division, in which capacity he joined Masséna, who was then defending the frontiers of France against the combined Austro-Russian armies; he took part in the battle of Zürich, and pursued the broken remains of Suwaroff's army. In 1800 he accompanied Masséna to Italy, where he conducted a series of bold and well devised operations to relieve Genoa, then besieged by an Austrian army; but on the point of storming Monte Cretó, an important position overlooking the city, he was severely wounded, and fell into the hands of the enemy. The victory of Marengo soon after procured his liberation. Bonaparte intrusted him with the command of one division of the army he was assembling for the invasion of England; and he was one of the first marshals of the empire created in 1804. In 1805, when the so called army of England was countermarched into Germany against the Austrians, Soult commanded the 4th corps, and participated largely in the campaign of Ulm and Austerlitz. The latter victory was in great part completed by his firmness and skilful manœuvring, and he was proclaimed by Napoleon the "first strategist of Europe." He was placed in command at Vienna, and took a brilliant part in the campaign against Prussia in 1806-'7. Two days after the victory of Jena he defeated at Greussen Gen. Kalckreuth, an old officer of Frederic the Great, and then, in conjunction with Murat and Bernadotte, carried by storm the city of Lübeck, which was defended by Blücher, that general himself falling into the hands of the conquerors. Finally he took possession of Königsberg, June 19, 1807, and was rewarded by being created duke of Dalmatia. When Napoleon resolved on the invasion of Spain, Soult was sent to that country, where during 5 years he passed through a succession of victories and defeats, the former adding to and the latter detracting nothing from his reputation. In conjunction with Bessières, he defeated the Spaniards at Burgos, Nov. 10, 1808. In the latter part of the same year he pursued the English troops under Sir John Moore toward Corunna; after a brisk engagement, during which the English general fell mortally wounded, the army of the latter embarked hastily, with their artillery, their stores, their wounded, and many prisoners, and Soult took possession of Corunna and Ferrol. He subsequently marched into Portugal, carried Oporto by a bloody battle, and conquered the northern part of that kingdom; but the superiority of the English army under Wellington soon obliged him to retreat into Spain, which, amid great difficulties and disastrous skirmishes, he accomplished to the admiration even of his opponents. He defeated the Spaniards at Arzobispo, Aug. 8, 1809, and completely destroyed their army at Ocaña, Nov. 19; then expelled the insur-

rectionary junta from Seville, and after a hard campaign of several months succeeded in subduing the whole south of Spain from Murcia to Badajoz. Being ordered in 1811 to aid Masséna, who was struggling against the English army in Portugal, he successfully marched through Estremadura, but was obliged to return into Andalusia. When Marshal Beresford first advanced to besiege Badajoz, Soult met him near Albuera, where a hard-fought battle took place, May 16, 1811, in which his army experienced dreadful loss; but he was able to retreat without being harassed by the enemy. A second attempt against Badajoz by the English was again foiled by his skilful operations; but a third one was successful, and Wellington, after a terrible assault, April 6, 1812, took possession of the long disputed city, a strategical point of the highest importance. The English commander then accomplished a series of successful operations, culminating in his victory over Marmont at Salamanca. The ascendancy of the French was at an end, and their armies received orders to concentrate on the banks of the Ebro. Soult reluctantly obeyed, brought back his troops through Spain to Alba de Tormes, and, being dissatisfied with the treatment he received at the hands of King Joseph, was happy to be recalled to France to take command of the imperial guard. But Joseph having been defeated at Vittoria, June 21, 1813, Napoleon appointed Soult commander-in-chief. On reaching the seat of war he found the army in a state of complete disorganization, while Pampeluna and St. Sebastian were besieged by the English. Soult, restoring order and spirit among his men, attempted to act offensively; but he was worsted at nearly every point, and had to fall back upon the intrenchments near Bayonne. He could not even stand here; the enemy, flushed with victory, and in the highest state of efficiency, drove him across the Adour river; but he disputed with indomitable courage every tenable point, maintained his army unbroken in front of superior forces, and came to a stand at Orthez, where he was nearly victorious, and finally retreated toward Toulouse, and, although closely pursued by Wellington, suffered very little loss. Under the walls of Toulouse, with an army inferior in numbers, he fought a last battle, April 10, 1814, which is reckoned among his most glorious exploits. The English, numbering three to one, were successful, but Soult led his army safely out of the city. The news of the emperor's first abdication, when fully confirmed, could alone bring him to an honorable capitulation. Napier, the historian of the Peninsular war, is lavish in his praise of Soult's conduct during this memorable campaign. Soult adhered to the new government, and evinced such devotion that he was appointed minister of war, Dec. 3, 1814; but he held this post for scarcely 8 months, the royalists looking suspiciously on his conduct. On the return of Napoleon from Elba, he was appoint-

ed major-general of the army, in which capacity he acted during the campaign of 1815. This caused his exile on the second restoration. He was allowed to reënter his native country in 1819, and ingratiated himself so much with the court that in 1827 he was promoted to a peerage by Charles X. On the revolution of 1830 he joined the Orleanist party, and was appointed minister of war. He fully reorganized the French army, which gave evidence of its efficiency in the expedition against Antwerp in 1832. From this time the part which Soult played in politics was nearly equal in importance to that of the duke of Wellington in England. In 1838 he went to England as the representative of the French king at the coronation of Queen Victoria, and was greeted there by court honors and popular acclamations. In 1839, and again in 1840, he was appointed to the premiership, holding at the same time the war department, and so continued until 1847, when his failing health obliged him to resign his office. On this occasion he received the extraordinary rank of marshal-general, which had been previously conferred only on Turenne, Villars, and Marshal Saxe. He spent his latter years at Soultsborg, the beautiful country estate he owned in the vicinity of his native village. His *Mémoires* were published in 1854 under the supervision of his son, Hector Soult.

SOUND. See ACOUSTICS.

SOUND, THE, a narrow strait, forming one of the passages between the Cattegat and the Baltic, and separating the Danish island of Seeland from the coast of Sweden. It is usually considered as extending from Elsinore to Helsingborg, a distance of 30 m., having an average width of 3 m. The depth ranges from 4 to 20 fathoms. The Danish kings formerly owned the territory on both sides of the strait, and from time immemorial all vessels passing through it were required to anchor at Elsinore and pay duty. This claim of the Danish government had been sanctioned by treaties, and was finally confirmed and regulated by the congress of Vienna in 1815. The sum paid by each vessel was not very large, being so much per ton, and amounting on an average to about \$40; but the detention often cost the loss of a favorable wind, and thus protracted the voyage. About 19,000 vessels passed Elsinore annually, and the average receipts were about \$765,000. On March 14, 1857, these duties were formally abolished by a treaty between Denmark and the commercial nations of Europe, the latter commutting the dues by the payment of the sum of \$17,889,480, of which Great Britain, owning nearly  $\frac{1}{3}$  of all the vessels passing the strait, paid \$5,445,997. A separate treaty was concluded between Denmark and the United States, by which the latter agreed to pay \$408,781. By these treaties, Denmark undertook for all future time the maintenance of the lighthouses and superintendence of the pilotage of the Sound.

SOUNDING, the practice at sea of casting the lead attached to a line measured off and marked in fathoms, in order to ascertain the depth of water, and sometimes also the character of the bottom, which may be done by the lead striking upon rock and communicating the impression through the line to the hand, or by its bringing up sand, pebbles, or shells adhering to tallow stuck upon the bottom of the lead for this purpose. On some parts of the coast experienced navigators depend very much upon indications thus obtained for judging of the position of the vessel in foggy weather. For an account of the methods practised for ascertaining the extreme depths of the ocean, known as "deep sea sounding," see ATLANTIC OCEAN, vol. ii. p. 303.

SOUTH, ROBERT, D.D., an English divine, born at Hackney, Middlesex, in 1633, died July 8, 1716. Attached from boyhood to the reigning monarchy, he read the Latin prayers at Westminster school on the day of the execution of Charles I., praying for his majesty by name. He entered Christchurch, Oxford, in 1651, at the same time with John Locke, and on taking the degree of bachelor in 1655 wrote as a university task a Latin poem, congratulating Cromwell on his late peace with the Dutch. He received the degree of master of arts in 1657, was ordained in 1658, was elected public orator of the university in 1660, soon afterward became chaplain to the chancellor Clarendon, and was made a prebendary of Westminster in 1663, and a canon of Christchurch, Oxford, in 1670. His sermons were noted for wit and sarcasm and a lively and vehement style. In 1677 he accompanied Lawrence Hyde, son of Clarendon, on his embassy to Poland, to congratulate John Sobieski on his election as king. On his return to England he was presented to the rectory of Islip, in Oxfordshire, where he gave his curate the then unprecedented salary of £100, and expended the rest of the income in educating poor children and improving the church and parsonage. He was one of the most zealous champions of passive obedience and the divine right, was opposed alike to Protestant dissent and to Roman Catholicism, preached with applause as royal chaplain before Charles II., but would accept no preferment either from Charles II., James, or William and Mary, though some of the highest dignities in the church were offered to him. When Sherlock published his "Vindication of the Holy and Ever Blessed Trinity," South attacked him for inculcating tritheism (1693), and the controversy was conducted with so much wit and personal invective as to give great offence. The king interposed to put an end to it, and a popular ballad turned the parties into ridicule. Notwithstanding his intolerant doctrines and fiery temper, he often gave in his sermons striking proofs of a Christian spirit, was a generous benefactor through life, and by his will devoted much of his property to charitable purposes. His sermons abound in conceits and metaphors, but are

suggestive, and, in respect of style, perspicuous and effective.

**SOUTH AMERICA.** See **AMERICA.**

**SOUTH AUSTRALIA**, a British colony, situated near the centre of the S. coast of Australia, bounded N. by unoccupied and almost totally unexplored territories, E. by the colonies of New South Wales and Victoria, S. by the South Pacific ocean, and W. by an unoccupied tract of West Australia; extending from lat.  $26^{\circ}$  to  $38^{\circ} 10'$  S., and from long.  $132^{\circ}$  to  $141^{\circ}$  E.; area about 800,000 sq. m.; pop. in 1860, 117,967. The settled part of the country lies chiefly between Spencer's gulf and the mouth of the Murray river, and is divided into 13 counties. The chief towns are Adelaide, the capital, Port Adelaide and Albert Town, Port Lincoln, Gawler Town, Angaston, and Kooninga. The coast line extends about 1,500 m., and is low and desolate in the W. part with sand hills at intervals, but toward the E. it rises to the height of from 500 to 800 feet, and becomes rocky and well wooded. The S. E. part is deeply indented by the gulfs of Spencer and St. Vincent, and there are several good bays and harbors. There are numerous islands off the coast, but they are all small with the exception of Kangaroo island, which is about 95 m. long and 25 broad. Kangaroos, though once so numerous as to give the name to this island, are now very scarce. It has several fine bays which afford good anchorage, and belts of iron ore and limestone run through the interior.—That part of the colony which lies W. of long.  $134^{\circ}$  E. is low and barren, destitute of trees or grass, and covered with scrub; but between that line and the head of Spencer's gulf there is a mountainous tract occupied by a number of rugged ranges called Gawler's range. These mountains run N. W., and at their W. extremity reach an elevation of about 2,000 feet above the sea, but decrease in height as they extend eastward. There is no fresh water except in the clefts of the rocks immediately after rain, but there are small salt water lakes among the hills. The only vegetation in this region is a kind of prickly grass, and some salsolaceous plants which grow on the margins of the lakes. The country immediately N. of these mountains contains extensive tracts of good pasture land watered by several fresh water lakes. On the S. W. part of the shore of Spencer's gulf the soil is of a better description, and there are large tracts of good grass land, and others that are well wooded; but toward the N. it is covered with scrub, and has but few patches of grass. Several mountains rise to a considerable height about the head of Spencer's gulf, and N. of them lies a level desert called Torrens basin, which is about 300 feet above the sea, and the sand is in places incrustated with salt. There are some mountains, one of which attains the height of 2,900 feet, on the E. side of Spencer's gulf, and between them there are extensive grassy plains, watered by numerous ponds and small rivers.

This region terminates in a peninsula about 100 m. long with an average breadth of about 15 m. The surface is generally level and mostly covered with open forest. The land to the E. of the gulf of St. Vincent is the most valuable. It is hilly, being occupied by a series of ranges mostly well wooded, and the undulating country between the ranges is well adapted for agricultural purposes.—The Murray, the largest river of Australia, enters the colony about lat.  $34^{\circ}$  S., and pursues a general W. course to about long.  $138^{\circ} 40'$  E., where it turns abruptly to the S. and flows to the sea, before entering which it expands into a large lake called Lake Victoria. Its course within South Australia is about 250 m., for the whole of which it is navigable. The other rivers are all small. The only lake of any considerable size is Lake Victoria already mentioned. It is about 30 m. long, and has an extreme breadth of 15, and though generally deep, the 3 channels which connect it with Encounter bay are shallow and terminated by dangerous sand bars. From the most eastern of these channels, a narrow lagoon or backwater, called Coorong, extends along the coast parallel to the shore for more than 100 m., separated from the sea by a strip of land of no great height. From its extremity in lat.  $36^{\circ} 30'$  S. a number of lakes extend, separated from the sea by grassy flats.—Iron ore is found in many parts of South Australia, lead in several places, and gold in small quantities; but copper constitutes the great mineral wealth of the colony. Numerous copper mines are worked, and about 20,000 tons of ore are annually raised, that of the Burra-Burra mines yielding 75 per cent. of metal. Salt is abundant, and jasper, chalcedony, and opal are all found.—The climate of the inhabited part of the country is very fine, but that of the desert to the N. is exceedingly hot and dry. In the S. E. the seasons are divided into the wet and the dry; the latter begins about the end of August and continues till the end of March. In December and January the heat is very great, and when the wind blows from the N. the thermometer often rises to  $115^{\circ}$ . These winds are accompanied by clouds of dust, but they seldom last more than a few hours, when they shift round to the S. W. and S., and the temperature falls immediately. These sudden changes are not injurious to health. The average temperature is  $67^{\circ}$ , and the lowest in the level country  $44^{\circ}$ . Between March and August heavy rain falls, and the country becomes covered with luxuriant verdure; but during the summer months the ground is completely parched and the grass withered. The settled parts of South Australia, however, are not subject to the long continued droughts which are sometimes so destructive in New South Wales.—The forests contain much useful timber of large dimensions, but wood for cabinet work and the finer purposes is imported from New South Wales and other places. The territory lying between

Torrens basin and the E. boundary of the colony contains much fine pasture land, and the settled districts produce all the ordinary grain crops, potatoes, and vegetables in great perfection. Wheat yields an average of 45 bushels to the acre. The only indigenous fruit is a kind of berry eaten by the natives; but all the fruit trees common to temperate climates have succeeded remarkably well. Many varieties of the grape are grown, together with oranges, lemons, and mulberries. Agriculture has latterly made great advances, and this colony promises to become a large grain-producing country. The native animals are the same as those of other parts of Australia, with the exception of the porcupine, which is found on Kangaroo island, but not on the mainland. All the domestic animals have been introduced, but much of the pasture lands appears to be better suited for cattle than sheep. The kangaroo dog is a valuable animal to the inhabitants of this as well as the neighboring colonies. He is a cross breed between the greyhound and English bulldog, often exceeds 3 feet in height, is strong and courageous, and is used in the chase of both the emu and kangaroo. Much damage is often done to the green crops by locusts. The most common land birds are the emu, many kinds of paroquets and cockatoos, partridges, and quails; of water fowl, there are pelicans, wild ducks, divers, black swans, different kinds of waders, and cormorants; and on the coasts are Cape pigeons and albatrosses. There are many varieties of snakes and lizards, among the latter of which is the iguana. Fish, including excellent oysters and other kinds of shell fish, are abundant, and during the winter months whales frequent the coast.—The aborigines of South Australia are of the same oriental negro race as those of other parts of Australia; but 4 different dialects are spoken by them within the limits of the colony, 3 of which are not intelligible to the natives of the country about the mouth of the Murray river. The tribes within the settled districts are inoffensive, and some of the boys are employed as herdsmen by the stock owners in the S. E. part of the colony. There are schools in some places for their instruction, but they make slow progress in the ways of civilized life.—The exports of South Australia consist almost entirely of farm produce, flour, wool, tallow, hides, beef, copper ore, and copper; in 1859 their value amounted to £1,655,876. The imports consist principally of different kinds of manufactured goods and articles of luxury, and during the same period they amounted to £1,507,494. In 1855 861 vessels of 114,982 tons entered the ports of the colony. The roads and bridges in the settled districts receive great attention, but as yet the only railroad is that which connects the capital with Port Adelaide. The Murray river is navigated by steamers, which ply to places in the interior of the neighboring colonies of Victoria and New South Wales. Steam communication is maintained with Melbourne,

whence lines diverge to all the other colonies to the S. and E., and monthly with West Australia, and with England *via* the Red sea. In March, 1855, there were 138 schools attended by 5,716 pupils. The revenue of the colony in 1859 amounted to £511,927, and the expenditure to £620,756. The government of the colony is organized in the same manner as that of New South Wales.—In 1835 a joint stock company, styled the "South Australian Colonization Association," obtained a grant from the British government of the immense tract of land which forms the colony of South Australia, and their first settlement was formed in Dec. 1836. Their operations gave rise to an immense speculation in the lands of the colony, both there and in England, town allotments which had been originally sold at £2 10s. an acre soon rising to £2,000 or £3,000, and country sections from £1 to £100 an acre. Building speculations equally extravagant were carried on, and laborers' wages rose to 15s. and £1 a day. In 1839 a reaction took place which brought about the ruin of the land owners, and most of the small moneyed settlers. In 1840 the population amounted to 14,610, 8,489 of whom resided in the town of Adelaide. In the same year the exports were £15,660, or nearly £1 per head, while the imports amounted to £278,000, or about £18 10s. per head of the inhabitants; the revenue was £30,199, and the expenditure £169,966. The current of immigration was turned to the other Australian colonies, and South Australia remained for some time greatly depressed, during which period the people turned their attention to agricultural and pastoral pursuits. In 1842 copper was discovered, which gave a new impulse to the trade of the colony. It was found at Burra-Burra in large masses of oxidated and carbonated copper ore lying on the surface, and connected with a vein underground afterward worked. The ore is principally shipped to England to be smelted, but some of it is sent to New South Wales. The discovery of gold in New South Wales and Victoria brought about a second period of depression in South Australia in 1851, the colony being almost deserted by its able-bodied men; but from this it soon recovered, and was stimulated by the measures of government and the influx of gold to a greater development of its own resources.

**SOUTH BEND**, a town and the seat of justice of St. Joseph co., Ind., situated on the S. bank of the St. Joseph river at its most southern point or bend, 85 m. E. from Chicago; pop. in 1860, 4,010. It is regularly laid out and substantially built, and is noted for its salubrity. The court house is one of the finest buildings in the state. South Bend is the seat of the northern Indiana college; and the university of Notre Dame, a Roman Catholic institution of high character, and St. Mary's female academy, are near the town. The branch of the state bank of Indiana has a handsome building in the Grecian style. There are many manu-



facturing establishments, a bank, a college, a very large hotel, 2 newspaper offices, 6 churches, and several excellent schools. An active trade is carried on in produce, lumber, and manufactured articles. The St. Joseph river furnishes ample facilities for manufacturing purposes. The Michigan southern and northern Indiana railroad passes through the town. South Bend was laid out in 1831.

**SOUTH CAROLINA.** See **CAROLINA.**

**SOUTH CAROLINA COLLEGE**, a seat of learning in Columbia, S. C., founded by act of assembly in 1801. The governor, lieutenant-governor, president of the senate and speaker of the house, and the judges and chancellors are trustees *ex officio*, and the governor is president of the board of trustees. The commencement hall is in the Corinthian style, and is 180 feet long, 68 feet wide, and 59 feet high. The college is liberally provided for by an endowment from the state and an annual appropriation of about \$25,000. Its presidents have been Jonathan Maxcy, Thomas Cooper, Robert Henry, Robert W. Barnwell, William O. Preston, James H. Thornwell, and A. B. Longstreet. The library contains 24,000 volumes, many of them rare and costly works. The faculty consists of a president and 8 professors. The whole number of the alumni is 3,000, and the number of undergraduates in 1860 was 202. The whole amount of expenditure by the state in behalf of the college has exceeded \$1,000,000.

**SOUTH WALES, New.** See **NEW SOUTH WALES.**

**SOUTHAMPTON**, a S. E. co. of Virginia, bordering on North Carolina, bounded E. by the Blackwater river and S. W. by the Meherrin, and intersected by the Nottaway; area, 600 sq. m.; pop. in 1860, 12,914, of whom 5,409 were slaves. The surface is nearly level and diversified by large forests of cypress and pine, and the soil is tolerably productive. Tar and turpentine are largely exported. The productions in 1850 were 564,183 bushels of Indian corn, 235,337 of sweet potatoes, 3,321 tons of hay, and 869 bales of cotton. There were 2 grist mills, 2 coach factories, 23 churches, and 288 pupils attending public schools. The value of real estate in 1856 was \$1,468,940, showing an increase of 34 per cent. since 1850. The county is traversed by the Portsmouth and Roanoke railroad. Capital, Jerusalem.

**SOUTHAMPTON**, a town of Hampshire, England, situated on the peninsula formed by the estuary of the river Itchen and the larger estuary of the Test, called the Southampton water, 71 m. S. W. from London, and 15 m. N. W. from Portsmouth; pop. in 1861, 46,970. The Southampton water varies in breadth from  $1\frac{1}{2}$  to 2 m., and extends inland from Calshot castle, 7 m. below Southampton, to Red Bridge, 4 m. above. The entrance to this arm of the sea is well sheltered by the Isle of Wight, and the channel is deep and straight, with good holding ground for anchors. Southampton is clean and well built, and well supplied with

water and gas. The High street is divided about the middle of its length by the Bar gate, a remnant of the ancient city walls. Two other old gates, the South gate and West gate, are still standing. The royal engineers engaged in the survey of the British islands have their headquarters here. Though Southampton is a place of great antiquity, and was long a fashionable watering place, it is to steam navigation that it owes its present prosperity and importance. It is the home port of various steam navigation companies, which run vessels to the Mediterranean, India, China, Manila, Australia, Mauritius, the W. coast of Africa, the West India islands, and the ports on both the E. and W. coasts of South America. Southampton is also a port of call, and has communication with the Isle of Wight, the channel islands, and daily with the continent of Europe. In 1840 it was selected as the port of departure for the steamers carrying both the East and West India mails, and 2 years afterward a tidal dock containing 16 acres, with 18 feet of water at low tide, was opened for the accommodation of the steamers. There are 3 graving docks opening into the tidal basin, one of which is 425 feet long on the floor, and 80 feet wide between the gate sills. The Southampton water has the advantage of 4 tides in the 24 hours; a peculiarity caused by the Isle of Wight intercepting a portion of the tidal wave in its progress both ways through the English channel. The mean rise of the spring tides is 18 feet, and of the neap tides 8 feet. During the year ending March 31, 1859, 1,017 ships of 323,361 tons entered the docks, and 918 of 323,965 tons cleared outward. The value of the exports exceeded £6,000,000. The manufacture which is carried on with greatest success at Southampton is coach building, and some 500 carriages are annually exported to different parts of the world. There are several engineering works for making and repairing machinery. In the suburbs of Portswood, Highfield, Bassett, Shirley, and Millbrook, there are many neat villas, inhabited principally by the families of retired military and naval officers.

**SOUTHARD, SAMUEL L.**, an American statesman, born in Baskingridge, N. J., June 9, 1787, died in Fredericksburg, Va., June 26, 1842. He was graduated at Princeton college in 1804, and shortly afterward removed to Virginia and entered upon the practice of law. He returned to New Jersey in 1811, and attained a high rank at the bar. In 1814 he was appointed state law reporter. In 1815 he was elected to the general assembly, and in a few days after taking his seat was chosen to the supreme court of the state. He was U. S. senator from 1821 to 1823, secretary of the navy under President Monroe, acting secretary of the treasury, and for a short time acting secretary of war. He was elected attorney-general of the state in 1830; in 1832 was chosen governor; and in 1833 reelected U. S. senator. In 1842 he was president of the U. S. senate.

**SOUTHCOTT, JOANNA**, an English religious enthusiast, born at Gittisham, Devonshire, about 1760, died in London, Dec. 27, 1814. Until nearly 40 years of age she was a domestic servant, and was for some years a member of the established church, but shortly before promulgating her peculiar notions united with the Wesleyans. In 1792 she began to attract attention by claiming supernatural powers, narrating remarkable revelations made to her in dreams, and making prophecies. She found many followers, over whom her influence appears to have been almost supreme. In the ordinary course of events it was natural that a portion of the many predictions she made should be verified, and these instances were speedily noised abroad and magnified by herself and followers, and contributed to her notoriety and power over those who adhered to her ideas. She published a number of prophecies and warnings in extravagant prose and rude doggerel, challenged the clergy to investigation and discussion, and labored with so much energy and zeal that her sect at the time of her death was estimated at 100,000 persons; and in 1857 there were still a number of persons in England who professed to believe her. When upward of 60 years old she announced that she was pregnant and would give birth to a second Shiloh. Shortly before her death she expressed the conviction that "if she was deceived, she had at all events been misled by some spirit, good or evil." A *post mortem* examination disclosed the fact that dropsy was mistaken by her for pregnancy; and so singular was her condition that even her physician had been led to believe her pregnant, and afterward made the case the subject of a medical treatise.

**SOUTHERN, THOMAS**, a British dramatist, born in Oxmantown, Ireland, in 1660, died May 26, 1746. After spending two years at Trinity college, Dublin, he entered in 1678 the Middle Temple, London, but soon gave up the law for literature, and became a popular writer of dramas. During the rising under the duke of Monmouth he entered the royal army, in which he attained the rank of captain. After quitting the service he continued to devote himself to dramatic composition, and died the richest, with a few exceptions, of the literary men of the time. Of the 10 plays which he wrote, two, "Isabella, or the Fatal Marriage," in which Mrs. Siddons won her first laurels, and "Oronooko," long held possession of the stage, and are creditable specimens of English dramatic literature during the last century. "Oronooko" was the vehicle through which the author uttered his denunciations of slavery and the slave trade; and Hallam ascribes to Southern the credit of being the first Englishman who agitated that subject. A complete edition of his works appeared in 1774.

**SOUTHEY, ROBERT**, an English author, born in Bristol, Aug. 12, 1774, died at Greta hall, near Keswick, March 21, 1843. From his 2d

year he lived successively at Bath and Bristol with his aunt, Miss Tyler, an eccentric lady, with a passion for the theatre, to which he was constantly taken. He was conversant with Shakespeare as soon as he could read, and at an early age was familiar with Beaumont and Fletcher, Tasso, Spenser, and other poets. He had passed under the hands of 6 school teachers, all of whom he condemns in his autobiography, and had composed a quantity of verse, when in his 14th year he was placed at Westminster school, the expenses of his education being borne by a maternal uncle. He was expelled from the school in 1792, having started with some of his associates a periodical entitled "The Flagellant," in which he inserted a satirical article on corporal punishment. In the same year he was entered at Balliol college, Oxford; accepted with enthusiasm the liberal ideas in politics and religion to which the French revolution had given currency; formed projects enough "for many years or many lives;" and began his career of unparalleled industry as a man of letters. Before his 30th year he is said to have burned more verses than he published during his whole life. "Impatient of all the oppressions that are done under the sun," he wrote in 1793 the dramatic poem of "Wat Tyler," first published surreptitiously in 1817, with which his name was often reproachfully coupled, and which was assailed in the house of commons as seditious. A Unitarian and a democrat, he had no prospects either in church or state, but associated himself with Coleridge and Lovell in planning a pantisocracy, or perfect society, on the banks of the Susquehanna. Lack of money necessitated the abandonment of the scheme. He left the university in 1794, concluded that he would be compelled "perforce to enter the muster roll of authors," published in connection with Lovell a volume of "Poems" (1794), and received from Cottle 50 guineas for his "Joan of Arc" (1795), an epic poem, as he himself afterward described it, "crudely conceived, rapidly executed, rashly prefaced, and prematurely hurried to publication," but which was nevertheless favorably received. Invited by his uncle to accompany him to Lisbon, he set out in Nov. 1795, immediately after his marriage with Miss Edith Fricker, was absent 6 months, and collected the materials for his "Letters written during a short Residence in Spain and Portugal" (1797). He was busy upon epics, tragedies, and romances, when, a college friend having granted him an annuity of £160, he went to London to study law. Both the city and the profession were hateful to him, and he soon took lodgings for most of the time in the country, and continued his literary pursuits. He was the editor and principal writer of the "Annual Anthology" for 1799 and 1800. His health failing, he again visited Portugal in 1800, extended his knowledge of the Spanish and Portuguese literature, collected materials for a history of Portugal, and on his return visited Coleridge at Greta hall, Keswick, the house

which soon became his own residence, and in which he spent the greater portion of his life. For his second epic poem, "Thalaba, the Destroyer," he received 100 guineas. The position of secretary to the chancellor of the exchequer for Ireland was offered to him, with a salary of £350, but he soon resigned what he termed "a foolish office and a good salary." Entering upon that course of professional authorship which was at once his business and his delight, he established himself in 1804 at Greta, about 14 miles from Wordsworth. From this time he appears in his writings as an uncompromising monarchist and churchman, and his life was marked by untiring, conscientious, and cheerful labor, by repeated acts of generosity, and by the tenderest domestic affection. "I have more in hand," he wrote, "than Bonaparte or Marquis Wellesley—digesting Gothic law, gleaning moral history from monkish legends, and conquering India, or rather Asia, with Albuquerque, filling up the chinks of the day by hunting in Jesuit chronicles, and compiling *Collectanea Hispanica et Gothica*." Thus severely occupied, he received under his roof his sisters-in-law, the wives of Lovell and Coleridge, assisted in editing the works of Chatterton for the benefit of the sister of that poet, and extended his kindness to several unfortunate poets, among whom was Henry Kirke White, whose "Remains" he edited with a biography. "My actions," he wrote, "are as regular as those of St. Dunstan's quarter boys. Three pages of history after breakfast (equivalent to 5 in small quarto printing); then to transcribe and copy for the press, or to make my selections and biographies, or what else suits my humor until after dinner time; from dinner till tea I read, write letters, see the newspaper, and very often indulge in a siesta; . . . after tea, I go to poetry, and correct, and rewrite, and copy till I am tired, and then turn to any thing else till supper; and this is my life, which, if it be not a very merry one, is yet as happy as heart could wish." Coleridge said: "I can't think of Southey without seeing him mending or using a pen." He visited and formed a lifelong intimacy with Sir Walter Scott in 1805; became an occasional contributor to the "Quarterly Review;" received from the Grenville ministry in 1807 a pension of £200; undertook in 1809 the historical department of the "Annual Register," for £400 a year; was appointed poet laureate on the death of Mr. Pye in 1813; was honored with the degree of LL.D. from the university of Oxford in 1821; visited Holland in 1825, and remained 3 weeks at Leyden in the house of Bilderdijk; declined the offer of a baronetcy by the government of Sir Robert Peel in 1835, but accepted the addition of £300 to his pension; made a tour in Normandy and Brittany after the death of his wife in 1837; and married the poetess Miss Caroline Bowles in 1839. His intense and protracted mental activity had now resulted in mental prostration; his memory failed, and his recognition

of time and place gave way; he wandered among his books as a stranger, taking them from the shelves, patting them, and replacing them with a faint consciousness of the change which time had wrought; and during the last year there was an utter extinction of his faculties. He left at his death a sum of about £12,000 to be divided among his 4 children, and one of the most remarkable private libraries in England, which was sold by auction in London.—There is scarcely a department of literature in which Southey did not engage. The most indefatigable of writers, never, whether at home or abroad, allowing a possibly suggestive thought or incident to escape him without being noted down, he often produced several elaborate works within a year. He published nothing that does not display his literary skill, generally pure taste, extensive knowledge of books, and conscientious devotion to letters as an art. Every volume, it has been said, reveals the man that feared God, honored the king, loved his country, and despised all political tinkers, whether in matters ecclesiastical or civil. His three best poems are "Thalaba, the Destroyer" (1801), an Arabian tale, arrayed in Mohammedan superstitions; "The Curse of Kehama" (1810), founded upon fables of the Hindoo mythology; and "Roderick, the Last of the Goths" (1814), the subject of which is the fall of the Gothic dominion in Spain. They are marked by rhetorical splendor, a wonderful power of invention and description, and a peculiar rhythmical harmony, and can scarcely fail to command the reader's admiration; but there is something artificial and mechanical in their tone which prevents them from being as interesting as they are beautiful. They are less read now than formerly, and even in 1813 Byron said that Southey had a party but no public. "Madoc," one of his longer poems, is founded on traditions of Welsh voyages to America; and his finest ballads and minor pieces are "Lord William," "Mary the Maid of the Inn," "Queen Orlica," "The Victory," "Youth and Age," "Elegy on a Favorite Dog," and "The Holly Tree." The most striking merit of his prose writings is their flowing, sprightly, and perspicuous style. His taste for quaint expressions, curious learning, natural history, church lore, and historic incidents, appears in the best of them. Macaulay esteems his "Life of Nelson" (1813) the most perfect and delightful of all his works. Beside his translations of "Amadis de Gaul" and the "Chronicle of the Old" from the Spanish, and of "Palmerin of England" from the Portuguese, there may be mentioned his "History of Brazil" (1810-'19), "Life of John Wesley" (1820), "History of the Peninsular War" (1822-'82), "Book of the Church" (1824), "Sir Thomas More, or Colloquies on the Progress and Prospects of Society" (1829), "Life of John Bunyan" (1830), "Essays, Moral and Political" (1832), and "The Doctor" (1834-'7; best edition, London, 1856). His curious erudition is happily shown in the

last, and also in his "Commonplace Book," made up from his annotations and selections, of which 4 volumes were edited after his death by his son-in-law, the Rev. J. W. Warter. He edited his poetical works (10 vols., 1837), and Mr. Warter has published 4 volumes of his "Letters." His life was written by his son, the Rev. C. O. Southey, in which is interwoven his correspondence with many distinguished men of his time (6 vols., 1849-'50).

**SOUTHWORTH, EMMA D. E. (NEVITT)**, an American authoress, born in Washington, D. C., Dec. 26, 1818. She was married in 1841, and 2 years later, being thrown upon her own resources, she resorted to her pen for a support, and made her first appearance as an authoress in the columns of the "National Era," a newspaper published in Washington by Dr. Bailey, and to which she became a regular contributor of tales and sketches. In 1849 appeared her first novel, "Retribution," previously published by instalments in the "National Era," and which had been written while she was engaged in teaching a public school in Washington. Her novels have since been produced with great rapidity, and include "The Deserted Wife," "Shannondale," "The Curse of Clifton," "The Lost Heiress," "The Discarded Daughter," and many others, which have enjoyed considerable popularity.

**SOUVESTRE, ÉMILE**, a French novelist, born at Morlaix, Finistère, in 1806, died in Paris in 1854. He commenced his literary career as editor of an opposition newspaper at Brest. Among his novels, which are distinguished by pure morality and genial sentiment, are *La confession d'un ouvrier* (1852), *Un philosophe sous les toits* (to which a prize was awarded by the French academy), *Le mémorial de famille*, and *La dernière étape, ou souvenirs d'un vieillard*, his last production. His *Scènes de la Chouannerie*, *Le foyer Breton*, and above all *Les derniers Bretons*, are graphic pictures of the manners of modern and old Brittany. He also wrote four 5-act dramas, and a number of lighter comedies. In 1853 he delivered in the chief cities of Switzerland a series of lectures which he afterward published under the title of *Causeries historiques et littéraires*. His complete works embrace about 20 vols. 12mo.

**SOVEREIGN**, a gold coin of Great Britain, the standard of value, equal to about \$4.86, first coined in 1817, from which time it began to supersede the guinea. The weight of the sovereign is determined by the law requiring that 20 lbs. troy weight of standard gold shall be coined into 934½ sovereigns. The weight of each one should then be 123.2744783806518-059 grains.

**SOWERBY. I. JAMES**, the first of a family of English naturalists and natural history artists, born in Lambeth, March 21, 1757, died Oct. 25, 1822. In early life he was a painter of portraits and miniatures; and having commenced the study of botany for the purpose of acquiring greater accuracy in executing foliage

and plants in his pictures, he was led to cultivate natural history and to practise his art principally in connection therewith. He published "English Botany," containing colored illustrations of every species of British plant, and of which the descriptive portions were written by Sir James Edward Smith; a folio volume "On the English Fungi or Mushrooms," containing colored illustrations; "British Mineralogy;" "British Miscellany," devoted to animal subjects; "Exotic Mineralogy," and the "Mineral Conchology of Great Britain," all splendidly illustrated with colored prints, and ranking among the most important works of their class produced during the period in which they appeared. He also published works on drawing and the science of color. His contributions to the "Transactions" of the Linnæan and geological societies, of both of which he was a fellow, were numerous. II. **JAMES DE CARLE**, son of the preceding, born in Stoke-Newington, June 5, 1787. He assisted his father in the preparation of the chief works published by the latter, and is the author of a number of papers, chiefly descriptive of fossil specimens, in the "Transactions" of the geological society. He aided in the establishment of the royal botanic society, of which he is the secretary. II. **GEORGE BRETtingham**, brother of the preceding, born in Lambeth, Aug. 12, 1788, died July 26, 1854. He early devoted much attention to entomology, and assisted his father in the entomological department of his works. Subsequently he became a dealer in natural curiosities and an authority in conchology, on which subject he published an elaborate work, "The Genera of Recent and Fossil Shells" (1820-'24), the drawings and engravings for which were executed by his father and brother. He was the author of a number of contributions to the scientific periodicals; of a description of the Tankerville collection of shells, of which he became the purchaser; and of several independent treatises on conchology. IV. **CHARLES EDWARD**, brother of the preceding, born Feb. 1, 1795, died in June, 1842. He devoted himself to the study of natural history, and published an edition of his father's "English Botany" with numerous additions. V. **GEORGE BRETtingham**, son of the above mentioned George Brettingham, born March 25, 1812. He is a well known writer on natural history and engraver, and has published a "Conchological Manual" (1839; 4th edition, 1852); "Conchological Illustrations" (1830-'42), in continuation of a work by his father; "Popular British Conchology" (1854); and a "Popular Guide to the Aquarium" (1857).

**SOWING MACHINE**, or **SEED SOWER**, a machine for uniformly distributing seeds over the surface of fields and immediately covering them with soil. The invention has been attributed to Joseph Locatelli, a nobleman of Carinthia, and was probably made about the year 1663; but it is claimed by the Italians for one of their countrymen as having been made

150 years before. The earlier machines consisted of a box placed across a plough and furnished with an inner cylinder armed with cogs. The ends of the cylinder projecting through the ends of the box were attached to wheels running on the ground; and as these turned they carried round the cylinder, and caused the seed in the box to drop through the holes in the bottom. The Italian machine, as appears from the description published in 1764, had below each hole a sort of iron funnel, the front part of which, shaped like a ploughshare, made, as the machine was carried forward, a furrow into which the seed dropped through the funnel, and was immediately covered over. This is the principle of the machines now in use, sometimes called drilling machines. They are constructed of various forms and sizes, some like a wheelbarrow with a single funnel or drill so light as to be easily pushed forward by hand; others require the labor of a horse, and others still are drawn by two horses. Both in England and the United States they have for some time past been made with circular brushes arranged at intervals upon a horizontal spindle that passed through the box or trough; and opposite each brush is a brass plate perforated with holes of different sizes, any of which may be closed or opened at pleasure, according to the size of the seed. In others the hopper and dropping fixtures are changed for peas, beans, corn, &c. These by the hand sower and single drill may be planted in drills or in hills, and if in rows 2 feet apart, an acre may be completed with one in 3 hours, the machine covering the seed as well and immediately compressing the surface over it. Batchelder's corn planter is drawn and guided like a plough. The planter itself is in the hollow share under the beam, upon which is the hopper. Under the tail is the roller for compressing the soil, and the revolution of this may be made to regulate the dropping of the seed at any desired spaces. Eight to ten acres may be planted in a day with one of these machines. The large machine called the grain drill and broadcast sower is the most efficient of these contrivances, and adapted for the greatest variety of seeds, to be sown either broadcast or in drills, and alone or mixed with dry pulverized fertilizers, as bone dust, guano, or plaster. It is furnished with a considerable number of hollow drills arranged on the line of the axle of the carriage. The trough forms the seat for the driver, and the machine is drawn by one or two horses. A man with two horses can put in from 10 to 12 acres of wheat, or with one horse from 15 to 20 acres of Indian corn per day. It is necessary in using machines of this character that the surface should be smoothly harrowed; and even then there is sometimes an uncertainty of depositing the seed at a uniform depth. A "broadcast sower" is also in use, which a man carries before him, and by turning a winch in the lower part causes the seed to be dispersed from the vessel above, and thrown out in every

direction through holes in a hollow cylinder with considerable regularity, far better than by hand scattering, and with great economy of seed.

SOY (Japanese, *soja*), a sauce prepared in Japan and China from the small beans of the plant called by McCulloch *dolichos soja*, and by others *soja hispida* or *soja Japonica*. The beans are boiled nearly to dryness, then put in wide-mouthed jars with water and molasses or brown sugar, and exposed to the sun and air. Every day they are well stirred; and when the fermentation is completed the mixture is strained, salted, and boiled, and skimmed until clarified. Japanese soy is considered the best; but there are many deceptions in the article. It is recognized by a peculiar flavor, neither too salt nor sweet; a thick consistence and clear brown color; and particularly by its leaving, when shaken in a glass, a coat of bright yellowish brown upon the sides. It is imported into Europe and the United States to be used with fish.

SOYER, ALEXIS, a French cook, born about 1800, died in England, Aug. 5, 1858. For several years anterior to 1850 he presided with great success over the *cuisines* of the Reform club, London; and during the great exhibition of 1851 he established a restaurant in Gore house, Kensington, formerly the residence of Lady Blessington. During the war with Russia he repaired to Constantinople, and by introducing among the troops an intelligent and economical system of cooking, added greatly to the comfort and health of those in the hospitals and in actual service. He published "Cookery for the People," *Délassments culinaires*, "Gastronomic Regenerator," "Modern Domestic Cookery," "The Modern Housewife," &c.

SPA, a town and watering place of Belgium, in the province and 17 m. S. E. from the city of Liège; pop. 3,817. It is situated in a delightful valley in the Ardennes mountains, is handsomely built, and has several public squares, a large church, two chapels, a theatre, hippodrome, &c. There are several manufactories of fancy wooden articles, snuff boxes, linen and cotton, soap, and leather. The Ponthon or principal spring is in the town, and a number of others are in the vicinity. These springs are annually resorted to by many persons in pursuit of health or pleasure, but the visitors are less numerous than formerly. The waters are chalybeate, and believed to possess great curative properties. It is estimated that 150,000 bottles are exported annually.

SPADA, LIONELLO, an Italian painter, born in Bologna in 1576, died in Parma in 1622. He received his earliest education in the school of the Carracci, where he was employed while a boy as a color grinder; but subsequently he became a pupil of Caravaggio. He rose to the foremost rank in his profession, and after executing important works in Reggio, Modena, and Parma, entered the service of Ranuccio, duke of Parma, whose death he did not long survive. His "San Domenico burning the pro-

scribed Books of the Heretics," in the church of that saint in Bologna, is considered his masterpiece.

SPAGNOLETTO, the name commonly applied to José Ribera, a Spanish painter, born in San Felipe de Jativa, Jan. 8, 1588, died in Naples in 1656. After studying for several years with his countryman, Francisco Ribalta, he became a pupil of Caravaggio, whose peculiar style he followed with enthusiasm. He finally established himself at Naples, where for upward of 40 years he was held in the highest estimation. He was a master of chiaroscuro, and delighted in horrible and gloomy subjects. His chief works are to be found in Madrid, the Escorial, and Naples; and the latter city possesses his "Martyrdom of St. Januarius," "St. Jerome and St. Bruno," and "Descent from the Cross." He executed a few etchings.

SPAIN (anc. *Iberia*; Lat. *Hispania*; Span. *España*), a kingdom of S. W. Europe, forming with Portugal the Pyrenean or Iberian peninsula. The name Hispania came into use among the Romans after the destruction of the Carthaginian power in the peninsula. It lies between lat. 36° 1' and 48° 46' N., and long. 3° 20' E. and 9° 21' W. Its greatest length N. and S., from Cape Peñas in Asturias to Tarifa point on the strait of Gibraltar, is about 540 m.; its greatest breadth E. and W., from Cape Creux in Catalonia to Cape Hombro on the bay of Vigo, about 620 m. On the N. E. it is connected by an isthmus about 240 m. wide with the rest of Europe, and on the W. it is partly bounded by Portugal; on all other sides it is surrounded by water, viz.: on the E., S. E., and S. by the Mediterranean and the strait of Gibraltar, on the S. W. and W. by the Atlantic ocean, and on the N. by the bay of Biscay. In extent it holds the 6th rank among European states, being surpassed by Russia, Sweden, the Austrian empire, France, and Turkey; but, inclusive of its territory outside of Europe, it is inferior only to the aggregate possessions of Great Britain, Russia, France, and Turkey. The following table exhibits the population and area of the entire monarchy, according to the returns of 1857 (including the recently annexed territory of the Dominican republic in the West Indies), together with the ancient kingdoms and provinces of the European portion, and the modern division into provinces effected in 1834:

Old divisions.	Provinces.	Pop. in 1857.
New Castile....	Madrid .....	475,785
	Toledo .....	823,765
	Guadalajara .....	199,059
	Cuenca .....	229,859
La Mancha .....	Ciudad Real .....	244,323
		1,477,915
Old Castile....	Burgos .....	333,356
	Logroño .....	173,512
	Santander .....	214,441
	Soria .....	147,483
	Segovia .....	146,539
	Ávila .....	164,039
	Palencia .....	185,970
	Valladolid .....	244,028
		1,609,943

Old divisions.	Provinces.	Pop. in 1857.
Leon .....	Leon .....	348,736
	Zamora .....	249,102
	Salamanca .....	263,516
		861,434
Asturias .....	Oviedo .....	524,529
Galicia .....	Corunna .....	551,939
	Lugo .....	494,186
	Orense .....	371,813
	Pontevedra .....	428,586
		1,776,579
Extremadura ..	Badajoz .....	404,981
	Caceres .....	302,134
		707,115
Andalusia .....	Seville .....	463,486
	Cádiz .....	383,073
	Huelva .....	174,891
	Córdoba .....	351,586
	Jaeen .....	245,579
	Granada .....	441,917
	Almería .....	315,664
	Malaga .....	451,406
		2,927,357
Murcia .....	Murcia .....	380,969
	Albacete .....	201,113
		582,087
Valencia .....	Valencia .....	606,608
	Alicante .....	373,953
	Castellón de la Plana .....	260,919
		1,246,435
Catalonia .....	Barcelona .....	713,734
	Tarragona .....	320,593
	Lerida .....	306,934
	Girona .....	310,970
		1,652,291
Aragon .....	Saragossa .....	384,176
	Huesca .....	257,839
	Teruel .....	238,623
		880,643
Navarre .....	Navarre .....	297,423
Basque prov. Inces .....	Biscay .....	160,579
	Gipuzcoa .....	156,493
	Álava .....	96,393
		413,470
	Balearic Islands .....	262,398
	Canary Islands (included by the Spaniards in their European possessions) ..	234,046
	Total of Spain in Europe ..	15,454,514
America .....	Cuba .....	1,449,463
	Porto Rico .....	380,000
	Virgin Islands .....	2,600
	St. Domingo .....	200,000
		2,032,062
Asia .....	Philippine Islands .....	2,679,500
Africa .....	The Presidios (Conta. Peñon de Velez, Alhucemas, and Melilla, on the N. coast of Morocco)	11,481
	Guinea Islands .....	5,590
		17,071
Oceania .....	Part of the Ladrone Islands .....	....

## SUMMARY.

Continents.	Area, sq. m.	Pop. in 1857.
Europe .....	193,244	15,454,514
America .....	61,779	2,032,063
Asia .....	52,143	2,679,500
Africa .....	516	17,071
Oceania .....	592	....
Total of the Spanish monarchy	803,279	20,183,147

According to the statement of the statistical central commission for 1861, the population of

the European possessions amounts to 16,560,813, which would give for the entire monarchy a population of about 22,000,000. The principal cities of Spain, in the order of their population, are Madrid, the capital, Barcelona, Seville, Valencia, Malaga, Murcia, Granada, Saragossa, and Cadiz. In population Spain ranks 7th among the powers of Europe, being surpassed by Russia, Austria, France, Great Britain, Prussia, and the new kingdom of Italy. The increase has been gradual since 1700, but latterly in a more rapid progression, as the following table shows:

Years.	Population.	Years.	Population.
1700.....	8,000,000	1834.....	12,597,719
1769.....	9,160,000	1849.....	14,216,219
1797.....	10,641,000	1857.....	15,454,514

The increase since 1834 has been about equally divided; only two provinces, Cuenca and Ciudad Real, show a small decrease, the one from 234,582 to 229,959, the other from 277,788 to 244,328. The largest ratio of increase is in the western provinces, where Lerida has advanced from 151,322 to 306,994, Valencia from 388,759 to 606,608, and Barcelona from 442,273 to 713,784. The thinnest population is found in the interior provinces of Leon, the two Castiles, and Extremadura; and the densest population is found in the north, in Galicia, Asturias, the Basque provinces, Navarre, Aragon, and Catalonia. The entire population is distributed among 145 *ciudades* (towns), 4,350 *villas* or hamlets, and 12,495 *pueblos* and *aldeas* (villages), making altogether 16,990 communities, which form 18,871 parishes. Spain is believed to have been in ancient times much more densely inhabited than during the last two centuries. Under the dominion of the Romans, the population, according to some calculations, was as high as 40,000,000; and in the 14th century it is believed to have still amounted to 24,000,000. The number of proprietors is 5,677,363; 2,433,301 possess real property in the country, and 1,807,899 in the towns; 595,535 are farmers, and 840,528 proprietors of herds and flocks. The number of merchants is 119,234, of scientific men 35,736, of artists and mechanics 88,728, and of manufacturers 67,327. The public functionaries number 90,031, of whom 22,362 are paid by the state, 62,976 by the municipalities, and 4,693 by provincial boards.—The coast line of Spain, which forms nearly two thirds of its perimeter, is about 1,370 m. in length, of which about 600 m. belong to the bay of Biscay and the Atlantic, and 770 m. to the Mediterranean. The N. coast, from the French frontier to Cape Ortegal and thence to the mouth of the Minho, is rocky, the height ranging from 40 to 300 feet. In the S. W., from the mouth of the Guadiana to that of the Guadalquivir, the shore is mostly low, sandy, and swampy; then it rises gradually, and in the bay of Algeiras presents suddenly the magnificent rock of Gibraltar. From Gibraltar to Cape Palos it is mostly rocky, but of little elevation. The E. coast, from Cape Palos to the French frontier, is alternately high and

low; a part of it is lined with lagoons, along which numerous salt works are established. The indentations of the Spanish coast are not considerable; the greatest are the bay of Rosas and the gulf of Ampolla in the E., and the gulf of Almeria, the strait and bay of Gibraltar, and the bay of Cadiz in the S. The most important capes are Capes Creux, St. Sebastian, St. Martin, and Palos in the E., Capes Gata and Trafalgar in the S., Cape Finisterre in the W., and capes Ortegal, Peñas, and Machichaco in the N. There are few islands near the Spanish coast; the most important of them are the Balearic, a group consisting of two larger (Majorca and Minorca) and a number of smaller islands. Other small islands are the Isla de Leon, on which Cadiz stands, and the Columbretes, off the coast of Valencia. A number of excellent harbors are found in the N. W. and W., of which those of Ferrol and Vigo are conspicuous; the S. W. has the almost unassailable harbor of Cadiz, and the N. E. the harbors of Barcelona and Rosas.—Spain has 230 rivers, of which only a few are navigable. Being bounded on the N. and S. by the mountain ranges, they flow either E. or W.; those flowing E. belong to the basin of the Mediterranean, the others to that of the Atlantic. The principal rivers which water the basins inclining toward the Mediterranean are the Ebro, Guadalaviar, Jucar, and Segura, each of which receives several affluents. Five large rivers run westward into the Atlantic, the Minho, Douro, Tagus, Guadiana, and Guadalquivir. Two of these, the Douro and the Tagus, have their mouths in the territory of Portugal, and two others, the Minho and Guadiana, on the confines of the two countries. The most important of them in point of navigation is the Guadalquivir, the others being encumbered with rocks, shallows, and falls. The lakes are not of great importance; the most remarkable is that of Albufera, S. of Valencia, beside which only the lake of Gallocante in Aragon and the lagoons of Palomeres and Caldera deserve to be mentioned.—The climate of Spain is divided into three greatly differing zones. The northern zone, which extends to the Ebro and the Minho, comprises Galicia, Asturias, the Basque provinces, Navarre, Catalonia and the northern part of Old Castile, and Aragon. The mountains which cover this zone, the glaciers and the perpetual snows of the Pyrénées, together with the N. and N. E. winds, lower the temperature, increase the number and supply of the waters, and promote vegetation. Agriculture is therefore the principal occupation of the inhabitants, especially of the Basques and Catalonians. The winters in this zone are generally cold, and the springs moist; but the climate is on the whole temperate. The middle zone, which embraces northern Valencia, New Castile, southern Old Castile and Aragon, Leon, and Extremadura, is composed of vast and elevated plateaux, whose uniform and monotonous surface is swept by the winds



and burned by the rays of the sun. Although high mountain ridges line and traverse this region, it has few rivers, and their water is not sufficient to fertilize it. The temperature is subject to extremes; the winters are cold and the summers burning; but the spring and autumn are pleasant. The southern zone, which comprises Andalusia, Murcia, and the province of southern Valencia, is exposed to the influence of the burning winds blowing from the deserts of Africa, and to the reflection of the rays of the sun on the naked and rocky mountain walls. The valleys in this zone are deeper and the plateaux less extended and better supplied with water than in the middle zone; the soil is more diversified and better adapted for agriculture. The temperature, delicious in autumn and in spring, is tropical in summer, and more rainy than cold in winter. Two kinds of winds are very troublesome. The *gallego*, a N. and N. W. wind, blowing from Galicia, is cold and piercing, and causes painful affections of the eye. The southern provinces are visited by the *solano*, the sirocco of Italy. —Spain is eminently a region of mountain ridges and broad elevated plateaux. From near the Mediterranean to the Atlantic the whole peninsula is traversed by successive mountain belts, including between them high lands watered by numerous small streams, the general course of which, shut in between these mountains, is toward the E. into the Mediterranean, or toward the W. into the Atlantic. The summit line which determines their direction may be traced parallel in general with the E. coast, and not more than one fourth the distance from it toward the W. side of the peninsula. Thus, the rivers flowing W. are for the most part 3 times the length of those which fall into the Mediterranean. The Ebro alone is an exception to this, a spur from the Cantabrian mountains toward central Spain shutting off the waters of Biscay and Navarre from a western course. The mountains are the termination on the European continent of the great chain, which, extending from Asia, passes, under various names, through central Europe and the south of France into Spain. As many as 5 distinct belts are traced across the peninsula, the highest and most prominent of which, ranging along the northern border, has been described under the heads CANTABRIAN MOUNTAINS, and PYRÉNÉES. Each belt is marked by bold precipitous fronts facing the south and gentler slopes toward the north; and in proceeding S. they are in general less and less strongly marked in elevation and ruggedness. The 2d belt, the Sierra de Guadarrama, divides Leon and Old Castile from Estremadura and New Castile, and the waters of the Douro from those of the Tagus. Some of its peaks rise above the regions of perpetual snow. That of Peñalara is 7,764 feet above the level of the sea. Other principal peaks are the Puerto del Pico in the province of Avila, and the Peña de Francia and Sierra de Gata in Estre-

madura. Toward the E., on the borders of Aragon, this belt is broken up into various irregular ranges which, under the name of the Iberian chain, including in this designation the spur from the Cantabrians before referred to, extend in a S. E. direction and spread over the E. coast. The 3d range, called the mountains of Toledo, separate the waters of the Tagus from those of the Guadiana. This range is less marked than the others. The next is the Sierra Morena, along whose southern slopes flow the branches of the Guadalquivir. Under various names this important belt is traced from the province of La Mancha on the E. to the southern extremity of Portugal at Cape St. Vincent. The name Morena, brown or dark-colored, is said to be given to the mountains from the dingy color of the forests of kermes oak along the southern edge. The southern coast range, of which the Sierra Nevada forms a part, and which is spoken of collectively by that name, runs close to the Mediterranean, through southern Murcia and Andalusia, from Cape Palos to Cadiz by one branch, and to the rock of Gibraltar by another. It contains the Cerro de Mulahacen, the highest point of the peninsula, and of Europe except in the Alps, being 11,678 feet high, and the peak of Veleta, 11,385 feet. Beside these there are numerous minor ranges, which may be regarded as offshoots or continuations of the principal chains. —The geological formations of Spain range with the mountains E. and W. across the peninsula, and consist in the mountains themselves of metamorphic granites and crystalline schists, and on their flanks are represented the silurian, devonian, and sometimes the carboniferous formations. In Asturias the last named are met with in highly tilted strata. The older palæozoic rocks are frequently covered by groups of the tertiary, some of the most recent of which, as along the southern slopes of the Guadarrama, lie inclined from the uplifting of the mountains, and in Leon along the Cantabrian range they even stand in a vertical position; but back from the mountains over the great plains of Castile the same strata lie horizontally. The uplifting of the Sierra Morena appears to have been previous to the deposition of the miocene, calcareous beds of which, filled with fresh water shells, are seen on both sides the mountain lying horizontally upon highly inclined silurian slates. The Iberian chain is in great part made up of the newer secondary formations. Moncayo on the western borders of Aragon, the highest mountain of this group, is referred to the Jura, and many other mountains in the eastern provinces more than 5,000 feet high are composed of jurassic or cretaceous rocks. These formations extend around on the S. coast, and the rock of Gibraltar is jurassic limestone. The trias also is traced from the Pyrénées to Andalusia, near the Mediterranean, in beds of conglomerates, sandstones, limestones, clays, marls, gypsum, and salt.—The mineral productions of Spain are vari-

ous and rich, and its mines of lead, mercury, tin, iron, silver, copper, salt, &c., have been worked from the remotest times. Accounts of most of them are given under the names just mentioned, and reference may also be made to the article *MINE* for a summary of their production. Iron ores are very generally diffused; but the total production of iron is only about 40,000 tons per annum. Linares, in the province of Jaen, and the Sierra de Gador, a spur of the Nevada, possess rich mines of lead. The little copper produced in Spain is chiefly from the mines of Linares and that of Rio Tinto to the N. of Seville, all in Andalusia. Tin ores are found only in Galicia, and are worked to a very moderate extent. The formations that contain them are probably the continuation of those of Cornwall on the opposite coast of England. Lead and copper are also found here, and in ancient times silver and gold were among the mineral productions of Galicia. Antimony was formerly extracted from the mines of La Mancha. Near Cordova in Catalonia are famous mines of rock salt associated with beds of gypsum in the trias formation. Silver is at present only obtained from the mines of Guadalcanal, in the province of Badajoz. The quicksilver mines of Almaden, in Ciudad Real, are the richest of Europe. Asturias and Aragon have important coal mines.—Spain is reckoned among the most fruitful countries of Europe. Wheat, maize, barley, hemp, and flax are extensively cultivated, especially in the eastern and northern provinces. Saffron and other dye plants are chiefly found in the interior. Mulberry trees are largely cultivated for rearing silkworms in Valencia, Murcia, and Granada. In the south of Spain there is an immense variety of the finer fruits, including the almond, date, fig, orange, citron, pomegranate, pineapple, and banana. Large forests, especially of evergreen oaks, including the cork tree, are still found in Asturias, the Pyrénées, the Sierra Morena, and the Sierra Nevada; but on the whole, Spain has less timber than any other of the larger countries of Europe, owing to the want of cultivation. The culture of the vine is general; but only the coast districts of Xerez, Rota, and Malaga, in Andalusia, and of Benicarlo and Alicante in Valencia, furnish considerable quantities for exportation. The quadrupeds, birds, reptiles, and insects are mostly of the same kind as those of S. France. Wild animals, as wolves, lynxes, foxes, and wild boars, are still to be found on the high mountains; but the bear, which two centuries ago was common, is only to be met with in the Pyrénées. Among the domestic animals the horse is especially noteworthy. Descended from breeds which the Moors introduced, the Spanish horse has preserved the fire, docility, grace, and vigor of the Arabian. Those of Seville, Granada, and Estremadura are most valued, and yet in recent times they have declined in reputation. Asses and mules are of a superior kind; the asses rival those of Egypt,

although mules are preferred for transportation. The bulls, which are often used for the national amusement of bull fights, are found wild in the Sierra Morena. Sheep are everywhere extensively raised, a considerable portion of which belong to the merino breed. Hogs are bred in vast numbers in Estremadura, Galicia, and Asturias, and are celebrated for the delicacy of their flesh. There are important fisheries on the coasts, but the fish of the ocean are preferred to those of the Mediterranean.—The immense majority of the population belong to the Spanish race, which has been formed from a mixture of the descendants of the old Iberians and Celts with the Carthaginians, Romans, Vandals, Suevi, Goths, and Arabians, with a general predominance of the Roman element, although the several provinces show in some respects marked differences in the national character. From the Romans the Spaniard has in particular inherited his pride, his solemn austerity, and his perseverance, while his passionateness gives evidence of Moorish descent, and many of the civil institutions testify to the influence of the Teutonic element. National amusements are music, singing, and dancing, the last named often assuming, especially in the favorite *fandango* and *bolero*, a passionate and sensuous character. From the Romans the Spaniards have also inherited a fondness for bull fights, which are still the greatest popular festivities, and equally delight all classes of society. In his love the Spaniard is fiery and enthusiastic, and easily carried away by a spirit of jealousy and revenge. On the whole, the Spaniards are a vigorous race. The men are generally tall and thin, their limbs well proportioned, hair black, eyes full of fire, features sharp, and gestures measured and solemn; their complexion is dark but clear. The women are well formed and generally distinguished for noble carriage; they are mostly intelligent and full of feeling. Beside the Spaniards proper, there are three other races, the Basques, the Modejars, and the gypsies. The Basques, probably the descendants of the ancient Iberians, numbering about 500,000, and forming the majority of the population in the Basque provinces and in Navarre, have retained their ancient language, manners, and customs. (See *BASQUES*.) The Modejars, about 60,000 in number, are the descendants of the Moors; they are chiefly found in Granada and Castile, and many of them still preserve the customs of their forefathers. The gypsies or Gitanos, numbering about 50,000, and scattered throughout Spain, speak a peculiar dialect current only among themselves. Spain has a very numerous nobility; according to some they form the 21st, according to others even the 15th, part of the population. The higher nobility (*titulados, grandes*) own immense possessions; while the lower class (*hidalgos*) are in many instances poor.—Agriculture, although still in its infancy, has made of late considerable progress. Wheat, which at the beginning of the

century was not yet grown in sufficient quantities to meet the demand for home consumption, forms now a considerable article of export. Excellent wines are to be found in a number of provinces, and constitute with oil the chief riches of some of them. The cultivation of vineyards is still capable of considerable extension, and is now receiving increased attention. Agriculture has especially made progress in Biscay, Navarre, and Aragon, and every inch of arable ground near the roads seems to have been cultivated. But the most careful cultivation is found in the *huertas*, or irrigated lands of Granada, Murcia, and Valencia, which are regarded as the gardens of Spain, and produce all kinds of fruits, vegetables, and plants. The farmers are for the most part wretchedly poor, and are obliged to obtain money at exorbitant prices by mortgaging their crops. Certain privileges, very injurious to the interests of agriculture, are enjoyed by the proprietors of large migratory flocks of sheep, especially merinos, called *mestas*. They are not only allowed to drive their flocks over village pastures and commons, but the proprietors of such cultivated lands as lie in their way are obliged to leave for them a wide path; and no new enclosures can be made in the line of their migrations, nor can any land that has once been in pasture be again cultivated till it has been offered to the *mesta* at a certain rate. Of the 75,991,683 *fanegas* of soil which Spain contains, no more than 41,217,188 are under cultivation, the remainder being still a desert without inhabitants. Of the cultivated land, 1,786,025 *fanegas* are watered, while the rest is naturally dry. The former comprise 1,370,090 *fanegas* of arable land, 67,347 planted with vines, and 74,618 planted with olive trees.—Manufacturing industry in former centuries was very prosperous. In the middle ages, the wool and silk tissues of Seville, Granada, and Baeza, the cloths of Murcia, and the arms of Toledo, enjoyed a high reputation. The expulsion of the Moors and Jews, the monopoly given to the royal manufactories, the onerous taxes weighing down private industry, and aggravated by the avidity of the fiscal agents, combined to undermine this prosperity. Seville in 1519 counted 16,000 silk workshops, employing 130,000 workmen; in 1673 it had only 405 manufactories. The manufactories of Segovia, in which formerly 25,500 pieces were annually produced, made in 1788 only 400 pieces. Of late, industry has greatly improved again, especially by the influx of foreign capital, as a considerable portion of the former property of the clergy has passed into the hands of French and English capitalists. Metallurgic industry has been developed in Guipuzcoa, Biscay, Aragon, Catalonia, and Granada; silk goods are manufactured at Barcelona, Manresa, Tarragona, Toledo, Seville, and Valencia; woollen stuffs at Segovia, Arevalo, Colmenar, and Alcoy; linen in Galicia and Catalonia; leather at Barcelona, Cordova, Burgos, Toledo, Grana-

da, and Madrid; and glassware at Barcelona. There are manufactories of firearms in the Basque provinces, Catalonia, and Segovia, and cannon foundries at Seville, Lierganes, Trubia, and Barcelona. The nominal capital subscribed for industrial enterprises in 1861 exceeded \$200,000,000, as shown in the following table:

10 banks of discount.....	\$15,000,000
7 credit societies.....	71,150,000
8 deposit banks.....	4,750,000
18 concessions of public works.....	73,850,000
17 insurance companies.....	26,200,000
47 other industrial associations.....	19,963,500

Total capital subscribed by private individuals...\$215,443,500

Subsidies granted by the government:

General or provincial roads.....	\$85,088,100
Railroads.....	11,607,700
Public works.....	8,626,800
Construction of new ports.....	64,093,500—104,413,100

Total funds.....\$319,566,600

—The first railroad in Spain was opened in 1848; it extended from Barcelona to Mataro, a distance of 15½ miles. Many others have been opened or commenced since. The following list shows the length and the receipts of those which were completed in 1861:

Lines.	Miles.	Receipts.
Madrid to Alicante, with a branch to Toledo.....	801¼	\$2,209,300
Aler to Santander.....	57	445,549
Valencia to Almansa.....	86¼	825,806
Cordova to Seville.....	82	285,788
Barcelona to Arenys de Mar.....	22½	211,767
Xerez to Trocadero.....	17½	136,538
Barcelona to Saragossa.....	41¼	164,692
Barcelona to Granollers.....	18½	142,645
Madrid to Saragossa (7 months).....	36½	105,824
Barcelona to Martorel.....	17	108,842
Langreo to Gijon.....	25½	99,624
Tarragona to Reus.....	9	88,099
Total.....	718¼	\$4,267,284

Notwithstanding the obstacles which the high mountains of the country oppose to the construction of railroads, their extension is pursued with great vigor. Beside those completed, the following lines had been commenced in 1861: from Carcajente to Gandia, from Palencia to Leon and Ponferrada, from Monforte to Vigo, and from Valencia to Tarragona; together, 457 miles. Many others have been contracted for. The subsidies which the government has been authorized by the cortes to grant for the construction of railroads amount to about \$30,000,000, and the private capital expended on them to \$60,000,000. There are several canals, many of them on a magnificent scale, but mostly unfinished and unfit for navigation. The chief of these are the imperial canal, commenced by Charles V. and extending along the right bank of the Ebro, and the canals of Castile, Manzanares, Murcia, Albacete, and Guadarama.—The most important articles of export consist of wines, specie, metals, especially lead, raisins, olive oil, flour, cork, soap, wool, brandies, and salt; and the imports comprise sugar, cotton and cotton goods, woollen, silk, and linen goods, iron bars, codfish, machines, cacao, guano, and coal. The following table exhibits the value of

the principal imports and exports in 1858, compared with their value in the preceding year :

IMPORTS.			
Articles.	1858.	Increase over 1857.	Decrease from 1857.
Sugar.....	\$6,519,250	\$577,700	....
Cotton.....	5,806,550	1,117,550	....
Tissues of wool.....	3,108,500	....	\$12,650
" cotton.....	1,745,600	....	27,250
" silk.....	1,792,050	....	234,050
" flax and hemp.....	677,250	90,000	....
Iron bars.....	2,709,950	1,154,600	....
Codfish.....	2,382,700	....	659,900
Machines.....	2,269,050	683,500	....
Cacao.....	1,820,650	....	601,100
Guano.....	1,807,800	1,782,600	....
Coal.....	1,579,000	416,350	....

EXPORTS.			
Articles.	1858.	Increase over 1857.	Decrease from 1857.
Wines.....	\$10,999,550	....	\$7,996,450
Specie.....	5,455,400	....	401,300
Lead.....	4,547,550	....	40,900
Ealains.....	3,910,750	\$927,750	....
Olive oil.....	3,605,900	499,650	....
Flour.....	3,067,450	....	495,650
Cork.....	1,210,900	....	519,350
Soap.....	920,550	217,850	....
Wool.....	913,100	....	113,050
Brandy.....	857,300	....	108,500
Metals, other than lead.....	804,100	226,750	....
Salt.....	722,050	238,550	....

The following table gives an exhibit of the Spanish commerce in 1858 with the most important foreign countries :

Countries.	Imports.	Exports.
France.....	\$23,880,250	\$13,573,250
England.....	16,718,250	9,825,650
Gibraltar.....	8,146,450	977,550
Sweden.....	1,859,750	240,600
Russia.....	625,550	684,650
Portugal.....	865,750	941,600
Sardinia.....	879,750	861,250
Hamburg and Bremen.....	732,750	1,895,650
Other European countries.....	2,916,200	1,895,650
United States.....	7,845,950	2,569,650
Cuba and Porto Rico.....	8,725,750	12,102,600
Mexico and South America.....	5,420,300	3,859,300
Asia.....	1,206,550	487,000
Africa.....	2,531,200	1,055,400
Total.....	\$75,254,750	\$50,005,400

The aggregate value of imports and exports in some of the previous years was as follows :

Years.	Imports.	Exports.
1851.....	\$34,382,414	\$24,375,373
1854.....	40,174,262	49,675,159
1856.....	65,207,908	58,181,856
1857.....	77,763,750	58,429,079

A comparison of these aggregates shows that the increase of both imports and exports has been over 100 per cent., the former a little exceeding the latter. The movement of shipping in 1857 and 1858 was as follows :

Years.	Entered.		Cleared.	
	Vessels.	Tonnage.	Vessels.	Tonnage.
1857.....	10,929	1,056,357	11,019	604,699
1858.....	9,106	1,009,509	6,940	582,067

The coasting trade in 1858 employed 33,334 vessels of 1,263,000 tons.—Nearly the whole population of Spain belongs to the Roman Catholic church. No other religious denomi-

nation is recognized by law or enjoys the right of public worship. To teach or to embrace Protestantism, or to circulate, buy, or sell Protestant books, is punishable by law. There are, however, small congregations of Protestants scattered throughout the kingdom, and the number of those who avow themselves Protestants is estimated at about 10,000. There are also several thousand foreign Jews, foreigners being allowed to live according to the rites of their religion. The Catholic church of Spain is at present divided into 59 dioceses, 9 of which are archbishoprics, viz.: Burgos, Santiago, Granada, Saragossa, Toledo, Tarragona, Seville, Valencia, and Valladolid. In the Spanish possessions out of Europe, there are in America 2 archbishoprics (Santiago de Cuba and St. Domingo) and 2 bishoprics; in Asia 1 archbishopric (Manila) and 3 bishoprics; and in Africa 2 bishoprics. In 1830 the clergy counted 152,305 members, among whom were 30,900 monks and 24,700 nuns in 1,940 convents. In 1835 and 1836 nearly all the convents were suppressed, and only a very few have recently been reestablished by special permission of the government. On the whole, there is at present a smaller number of convents than in any other Catholic country of the world, except Portugal. The church owned in former times immense possessions, but in 1835 they were declared national property and confiscated, and the clergy indemnified by fixed salaries. Up to 1839 the ecclesiastical property which had been sold amounted to \$78,000,000. A concordat, concluded Aug. 15, 1859, and promulgated Jan. 14, 1860, stipulates that the church shall remain in the possession of all the property not yet disposed of, and shall have in future the right of acquiring property of any kind.—The organization of public instruction dates from the year 1845. At the head of educational affairs is a royal council subdivided into 6 sections, viz.: primary instruction, philosophy, ecclesiastical sciences, jurisprudence, medical science, and administration of public instruction. In 1852 there were 17,009 primary schools for boys, and 5,021 for girls. The number of pupils was about 500,000. There were fewer than 2,000,000 individuals who were able to read, and scarcely 1,200,000 knew how to read and to write. Since then the government has made laudable efforts to improve public instruction, and the higher institutions of learning have been the object of special solicitude. There are 774 Latin schools and 8 royal gymnasia to prepare young men for the seminaries, 56 in number, or for the universities, of which there are 10, viz.: Madrid, Barcelona, Granada, Oviedo, Salamanca, Seville, Santiago, Valencia, Valladolid, and Saragossa. Special instruction is provided for by a school of engineering, 12 commercial schools, a college for the deaf and dumb, a school for the blind, and a higher veterinary school at Madrid, with branch establishments at Cordova and Saragossa. Spain has many literary societies, yet

none of them can compare with similar societies in most other European countries. The best known among them are the academy of sciences at Seville; the academy of plastic arts at Madrid; the academies of arts at Seville, Oadiz, Valencia, Saragossa, and Palma; the academy of history at Madrid; and the academy of geography at Valladolid. Of public libraries there are the royal library and 6 others at Madrid, one in the Escorial, 2 at Valencia, 2 at Saragossa, and one at Toledo, beside those belonging to the different universities.

—The government of Spain, which has undergone a great many changes since 1812, is a constitutional monarchy, hereditary in the male and female line. The king (or the queen) is possessed of the executive power and of all the rights of sovereignty; he exercises the judicial power through judges, and shares the right of legislation with the cortes. The latter consist of two chambers, the senate and the congress. The number of members of congress is fixed by a law of 1852 at 271, who must be 30 years old, must pay \$150 taxes, and be residents of the district; they are chosen by the 150 highest tax payers of the district. The senate consists partly of hereditary grandees, who must have at least an annual income of \$12,000 from their landed property, partly of the highest ecclesiastical dignitaries, and partly of life members appointed by the crown. The ministry consists at present (1861) of 7 departments, viz.: of foreign affairs (*estado*), of justice (*gracia y justicia*), of finances (*hacienda*), of the interior (*governacion*), of commerce, instruction, and public works (*fomento y instruccion*), of war and the colonies (*guerra y ultramar*), and of the navy (*marina*); beside whom there are 6 under secretaries, or general directors. The council of state, since its recent reorganization by the cortes, sanctioned by a royal decree of Sept. 1, 1860, consists of the ministers of the crown, a president, and 32 councillors. At the head of each of the old provinces of New Castile, Old Castile, Catalonia, Aragon, Valencia, Murcia, Navarre, Andalusia, Granada, Estremadura, and Galicia, of the Balearic islands, and of the colonies of Cuba (Havana), Porto Rico, the Philippine islands (Manila), the Canaries, and St. Domingo, is a captain-general (formerly a viceroy). In 1833 Spain, including the Balearic and Canary islands, was divided (after the model of the French *départements*) into 49 provinces, each of which is under the administration of a *delegado del fomento*, and as to policy under a *gefe político*. The provinces are subdivided into districts (*partidos*). The communities (*pueblos*) are administered by elective municipalities (*ayuntamientos*), at the head of which is an *alcalde*. The Spanish army was reorganized on its present basis in 1844, and has been making of late great progress both in numbers and efficiency. It has a disproportionately large number of officers, who have exercised a prominent influence in the civil wars and political contests of

the country. In 1861 the army counted 10 captains-general (a dignity corresponding to the field marshal of other European armies), 61 lieutenant-generals, 142 major-generals, and 375 brigadier-generals. The general staff consisted of 3 brigadiers, 9 colonels, 12 lieutenant-colonels, 25 majors, 60 captains, and 40 lieutenants. The various arms were as follows:

	Men
Royal halberdiers.....	238
Infantry:—40 regiments of the line (each having 2 battalions of 8 companies), 1 regiment <i>fijo</i> of Centa (8 battalions), 20 battalions of chasseurs (500 men each), and 80 battalions of provincial militia; together.....	169,973
Cavalry:—4 regiments of carabiniers, 4 of cuirassiers, 6 of lancers, 4 of chasseurs, 2 of hussars (each divided into 4 squadrons of 520 men each), 2 squadrons of chasseurs, and 4 squadrons.....	15,563
Artillery:—5 regiments on foot, 4 brigades of flying artillery, 2 brigades of mountain artillery, 1 brigade of mounted artillery, and 5 brigades <i>fijas</i> on foot.....	12,869
Engineers:—1 general inspector, 14 directors, 2 regiments of engineers (of 2 battalions each).....	4,016
Gendarmes ( <i>guardia civil</i> ).....	12,951
Militia on the Canary islands (6 battalions of infantry, 17 companies of artillery).....	7,329
Corps of carabiniers.....	11,734
Catalonian corps.....	516
Total.....	234,753

There is a school of infantry cadets at Toledo, a school of cavalry cadets (established in 1851) at Alcala de Henares, a special school of artillerymen, an academy of engineers, and a school of the general staff at Madrid, and a general military school at Toledo. Spain has 125 fortified places, among which are 25 of the first order. The navy, which in former times commanded all seas, has only very recently begun to improve again. The fleet in 1861 consisted of 46 sailing vessels, viz.: 2 ships of the line, 84 guns; 3 frigates, having each from 32 to 42 guns; 4 corvettes, 16 to 36 guns; 8 brigs, 12 to 18 guns; 1 brigantine, 6 guns; 28 vessels of smaller size; and 65 screw and 29 paddle wheel steam vessels, among which is one screw steamship of the line, with 100 guns. There were in the course of construction 2 ships of the line of 100 guns each, 2 frigates of 40 each, 8 frigates of 51 each, 8 schooners, and 18 gun boats. There were beside 111 ships for the defence of the coast, armed in proportion to their size, and 24 armed vessels on the Philippines. There were connected with the navy (in 1861) 1,121 officers of all grades, 189 paymasters, 93 mechanics, 12,976 seamen, 7,980 mariners, and 539 guards of the arsenals.—The finances of Spain during the first decades of the present century were in a wretched condition, and the state was several times on the brink of bankruptcy. Recently a considerable improvement has taken place, and the budgets have several times shown a surplus of receipts. The following table of the budgets from 1851 to 1861 exhibits the financial progress of the country:

Yrs.	Receipts.	Expenditure.	Yrs.	Receipts.	Expenditure.
1851	\$56,009,798	\$58,523,564	1857	\$78,181,570	\$80,165,024
1852	59,433,738	57,889,078	1858	88,757,769	88,757,769
1853	61,674,879	60,485,487	1859	89,736,590	89,496,202
1854	73,557,394	73,710,126	1860	94,868,491	94,617,900
1855	73,454,045	73,369,490	1861	96,984,000	96,645,515
1856	73,564,813	73,546,388			

The receipts and expenditures in detail in 1861 were as follows:

RECEIPTS.	
Direct taxes.....	\$26,048,500
Indirect taxes.....	28,110,150
Stamps, &c.....	35,701,200
Property and dues of the state.....	5,129,150
Surplus of the colonial receipts.....	6,950,000
<b>Total.....</b>	<b>\$96,934,000</b>
EXPENDITURES.	
General obligations of the state.....	\$28,976,231
President of the council.....	21,500
Ministry of state.....	595,897
Statistics.....	804,691
Ministry of justice.....	10,199,257
" war and the colonies.....	18,441,681
" the navy.....	5,719,051
" the interior.....	4,359,526
" public works.....	4,426,771
" finances.....	22,606,043
<b>Total.....</b>	<b>\$96,320,507</b>

The special budget of the national property and extraordinary works and expenditures for the same year was as follows:

RECEIPTS.	
Receipts from the sale of national property.....	\$12,272,530
Amount of redeemable treasury notes.....	8,144,200
Refunding of subsidies for railroads.....	1,000,000
<b>Total.....</b>	<b>\$21,416,730</b>
EXPENDITURES.	
Cost of sale.....	\$270,875
Amortization.....	1,150,600
Ministry of justice.....	445,000
" war.....	2,200,000
" the navy.....	5,000,000
" the interior.....	1,580,850
" public works.....	8,435,000
" finances.....	200,000
Subsidies for railroads.....	1,504,923
Amortization of railroad obligations.....	124,000
<b>Total.....</b>	<b>\$21,916,643</b>

The consolidated debt on Nov. 1, 1858, was \$674,254,950. The floating debt, July 1, 1860, was \$35,991,376, and on July 1, 1861, \$32,971,004. According to the *Annuaire de l'économie politique*, by Block and Guillaumin (Paris, 1860), the debt on Jan. 1, 1860, was as follows:

Bearing interest.....	\$508,276,501
Not bearing interest.....	126,540,338
<b>Total.....</b>	<b>\$635,116,839</b>

—The primitive inhabitants of Spain were the Iberians. They mingled in remote antiquity with the Celts, who had immigrated from France, and from this mixture arose the Celtiberians. About 1000 B. C. the Phœnicians came to Spain, took possession of the coast on the Mediterranean, in the modern provinces of Granada, Murcia, and Valencia, and founded several colonies, including Tartessus, the biblical Tarshish, and Gades (Cadiz). They were soon followed by the Greeks, among whose colonies were Emporiæ (now Ampurias, on the coast of Catalonia) and Saguntum (Murviedro, on the coast of Valencia). After the first Punic war the Carthaginians began to establish themselves in Spain, and, under the leadership of Hamilcar and Hasdrubal, subdued a number of tribes on the S. and E. coasts. Among the cities founded by them was New Carthage (now Carthagena), which soon became a celebrated emporium. Pressed by the Carthaginians, the

Greek colonies of Saguntum and Emporiæ applied for aid to the Romans, who obtained from Carthage an agreement not to extend its dominion beyond the Iberus (Ebro), and to respect the independence of Saguntum. The siege and subsequent destruction of Saguntum by Hannibal in 219 B. C. led to the second Punic war, which was mostly carried on in Spain, and after many vicissitudes ended in 206 with the total expulsion of the Carthaginians. The Romans now undertook the subjugation of the entire peninsula, but did not fully succeed until after a war of about 200 years, in which the exploits of the Lusitanian Viriathus, the heroic resistance and final downfall of Numantia (133), and the temporary independence of a part of the country under the gallant Sertorius (84 to 73) form brilliant episodes. In 19 B. C. the subjection of all Spain, with the exception of the Basques, was completed. The country was made a Roman province, and became so thoroughly Romanized that it was one of the principal seats of Roman civilization and literature. Christianity was early introduced, and in the time of Constantine the Christianization of the entire country was completed. The dissolution of the Roman empire called several German tribes to Spain, who encountered but feeble resistance. The Suevi founded an empire in the N. W. part, in the province of Gallæcia (Galicia); the Alani occupied Lusitania (Portugal); and the Vandals settled in the southern province of Bætica, which was called after them Vandalusia (now Andalusia). The Romans called to their aid the Visigoths, who had a powerful empire in S. W. France, already extending across the Pyrénées, as far as the Ebro. King Wallia of the Visigoths in A. D. 418 destroyed the empire of the Silingi, a tribe of the Vandals, in S. Spain, and so reduced the power of the Alani that they fused with the Vandals, who in their turn in 429 left under Genseric for N. Africa, where they founded a great empire. The Visigoths soon subdued the whole of Spain with the exception of the N. W., which remained in the possession of the Suevi until 585, when their empire was destroyed by the Visigothic King Leovigild. One of the greatest kings of the Visigoths was Euric, who in 471 put an end to the dominion of the Romans, and gave to Spain the first written laws. Under Recared I. the Visigoths, who until then had been Arians, adopted the Catholic faith (586), a step which greatly facilitated the thorough coalescence of the Gothic, the Latin, and the native Spanish elements of the population into one Spanish nationality, with a general prevalence of the Latin element. The constitution of the Visigoths was an elective monarchy, which, as in other countries, proved to be a prolific source of violence, assassination, and civil war, and finally led to the destruction of the empire. The family of Alaric, which had been dissatisfied at a new election, called the Arabs, who had an empire on the N. coast of Africa (in Mauritania, whence they were called

Moors), into Spain, and King Roderic fell in the great battle at Xerez de la Frontera, which lasted 7 days (July 19 to 26, 711). The Arabians, under the leadership of Tarik, Abuzara, and Musa, completed within 5 years the subjugation of the country, with the exception of the mountainous districts Asturia, Cantabria (E. of the preceding), and Navarre, where a Gothic prince, Pelagius (Spanish, Pelayo), was elected king, and maintained himself successfully against the invasion of the Arabs. The conquered part of Spain became at first a province of the caliphate of Bagdad, but in 756 an independent Spanish caliphate was established by Abderrahman I. at Cordova, which attained a high degree of prosperity under Abderrahman III. and his son Hakem II. (died 976). Agriculture, commerce, sciences, and art were all in a flourishing condition, and the literary institutions of the Spanish Mohammedans were so celebrated that they were frequented by Christian students from all countries of Europe. With the deposition of Hishem III. (1031), the decay of the caliphate commenced, and soon even the name disappeared. The former provinces became independent kingdoms, of which there were more than 20, the most important being those of Saragossa, Toledo, Valencia, Seville, Cordova, and Granada. The language and the customs of the Moors became generally predominant; the Christians were deprived of their political rights, yet retained the free exercise of their religion. The little Christian kingdom, which maintained itself under Pelagius in the mountainous districts of N. W. Spain, was at first limited to Oviedo, and therefore called the kingdom of Oviedo. The second successor of Pelagius, Alfonso I., the Catholic, conquered Galicia, with a part of Leon and Castile, and assumed the title of king of Asturias. The whole of Leon was conquered by Alfonso III., the Great (abdicated 910), whose son Ordoño II. transferred his residence to the city of Leon, and called his dominion the kingdom of Leon. N. E. Spain was conquered by Charlemagne, and out of this "Marca Hispanica" arose in the course of time the kingdoms of Navarre and Catalonia. Near the sources of the Ebro and the Pisuerga arose even earlier the kingdom of Castile, at first a small republic, consisting of some forts and a few towns. If it was ever fully subdued by the Moors, it recovered its independence very soon, for as early as 759 there appears a count of Castile. Its territory was soon enlarged, and for some time the princes became vassals of the kings of Asturias, but in 961 they recovered their independence. They soon assumed the title of king, and in 1037, after the death of the last king of Leon, Ferdinand I., the Great, united the kingdom of Leon with Castile, which was henceforth the most powerful Spanish state. Aragon, Galicia, Portugal, Murcia, and other states owed their origin to the prevailing custom of dividing a kingdom among the sons of a deceased mon-

arch. Though frequently warring against each other, the Christian kings steadily repressed the power of the Moors, who by their increasing refinement had become unwelcome. It was in vain that they called the Almoravides, and later the Almohades, from Morocco to their aid; the result of temporary successes was soon lost again; and after the great victory which the united Christian princes, under the leadership of Alfonso IX. of Castile, gained over the Almohades at Tolosa in the Sierra Morena, only the two kingdoms of Cordova and Granada remained to the Moors, and even they soon after had to recognize the sovereignty of Castile. Among the Christian states of Spain, Aragon and Castile became the most powerful, and in the course of time absorbed all the others. Aragon, which in 1118 fell by inheritance to the counts of Catalonia, extended itself especially on the E. coast. Pedro I. conquered the principality of Huesca; Alfonso I. (in 1115) Saragossa, which he made his capital; Alfonso II. and Pedro the Catholic likewise enlarged the empire; James I., the Conqueror, seized the island of Majorca in 1220, and wrested from the Moors the kingdom of Valencia; Pedro III. occupied Sicily in 1282, and expelled the Moors from the Balearic and Pityusan islands; and Alfonso V. united Naples with his kingdom. But, while enlarging its territory, Aragon suffered at home almost continually from civil broils and plots, from contests between the grandees and the kings, and from oppression of the people by taxes. It was, however, the first Christian state in which the third estate obtained a legal position. The cortes, consisting of representatives of the higher and lower nobility, of the clergy, and of the towns, received more extensive privileges, and the king could not act in important matters without their consent. To prevent future encroachments upon the constitution, the supreme judge, called *justicia*, was clothed with the authority to decide finally in all difficulties arising between the king and the cortes; and under Alfonso V. (1416-'58) it was provided that the *justicia* could be appointed only with the consent of the cortes. When the Catalan line of princes became extinct, the cortes in 1412 elected Ferdinand, infante of Castile, their king, whose descendants ruled over Aragon until the end of the 15th century, when the marriage of Ferdinand V., the Catholic, of Aragon, with Isabella of Castile, consolidated all Christian Spain into one kingdom. Among the more prominent kings of Castile are Ferdinand III. (1217-'52), who by successful wars against the Moors annexed Cordova, Seville, and Cadiz to his dominions; his son Alfonso X., the Wise (1252-'84), a patron of science and art, and himself a great scholar, but a weak ruler, under whom the Moors made new conquests in the southern part of the country, and who while aspiring to the imperial crown of the Roman empire lost that of Spain; and Alfonso XI. (1284-'50), who destroyed for ever the power of the



Moors. In Castile the towns possessed fewer rights and attained less prosperity than in Aragon, while on the other hand the privileges and the power of the clergy and the nobility, which included the 3 orders of the knights of Calatrava, Compostela, and Alcantara, were more extensive. In the 15th century, during the reign of minor princes, the clergy and nobility usurped so much of the royal prerogatives, that when Isabella (1474-1504) ascended the throne, royalty was almost powerless. The marriage of Ferdinand of Aragon and Isabella of Castile did not lead at once to an entire coalescence of the two kingdoms, for they retained the separate administration of their respective native dominions. But in concert with their great minister, Cardinal Ximenes, they pursued harmoniously the aim of fusing all the states of Spain, which still differed in religion, customs, and laws, into an ecclesiastical and political unity, and to strengthen the power of royalty at the expense of the clergy, the aristocracy, and the towns. To this end Ferdinand united the dignity of grand master of the 3 Castilian orders of knights for ever with the Spanish crown, solicited and obtained from the pope the right of nominating all bishops, expelled all the Moors and Jews from the Spanish soil, and reorganized the inquisition, which in the hands of the Spanish monarchs became so powerful an instrument, not only for suppressing all secession from the ecclesiastical unity, but also for breaking the power of dangerous noblemen and bishops. (See INQUISITION.) The subjugation of the kingdom of Granada, the last Moorish possession in Spain (1491-'2), completed the political consolidation of the kingdom; while the conquest of Naples by Gonsalvo de Cordova, and still more the discovery of America by Columbus, and the subsequent occupation of large portions of North, Central, and South America by Spanish generals, soon raised the new kingdom of Spain to a front rank among the powers of the earth. The expeditions to America led, however, to a neglect of the native soil, and the expulsion of the industrious Jews and Moors proved to the flourishing industry of Spain a fatal blow, from which the country has but recently begun to recover. Ferdinand was succeeded in 1516 by his grandson Charles I. (Charles V. of Germany), who permanently united Castile and Aragon, inherited from his paternal grandfather the Netherlands, was elected emperor of Germany, and conquered Milan. At the beginning of his reign serious insurrections broke out in Valencia and Castile, where the people demanded a more liberal constitution; but they were soon quelled, and resulted in the abolition of the principal rights of the towns, the restriction of the powers of the cortes, and a stronger attachment of the clergy and nobility to the crown. The conquest of Mexico by Cortes, and of Peru and Chili by Pizarro and Almagro, poured immense riches into the royal treasury; but the wars of

Charles against Francis I. of France, against the Protestants of Germany, against the people of Ghent in the Netherlands, against Pope Clement VII. in Italy, and against Tunis and Algiers, exhausted the revenues of the country, burdened the people with enormous taxes, and required the contracting of a heavy debt. Under the reign of his son Philip II. (1556-'98) the vast monarchy began to decay. Philip conquered Portugal, which from 1581 to 1640 remained united with Spain; but this conquest, together with the war against the revolted Netherlands, the unfortunate naval struggle against England, in which the "invincible armada" was destroyed and Cadiz captured by the English, and the extravagance displayed in the building of the Escorial, exhausted the strength of the country. The despotic measures adopted by the inquisition for crushing out Protestantism and the concealed remnants of the Moors and Jews, and by the king for destroying still more thoroughly the ancient privileges of the people, had in great part the desired effect, but also completed the ruin of Spanish commerce, agriculture, and industry. Literature and art, however, continued in a flourishing condition, and the Spanish language and fashions controlled the courts of Europe. The imbecile and fanatical Philip III. (1598-1621) left the reins of government to his favorite, Count Lerma, who squandered the revenues of the state, and drove the last of the Moriscos, some 600,000 in number, out of Spain. Under Philip IV. (1621-'65) Portugal recovered its independence; Catalonia was devastated for 10 years by a civil war; the Dutch infested the Spanish possessions in America, especially Peru; 8 fleets were destroyed by gales, diseases, and the enemy; the Protestant Netherlands were abandoned for ever (1634); insurrections broke out in Naples and Sicily; and the enmity between Olivarez, the Spanish minister, and Richelieu, involved Spain in a war with France, by which the former lost Roussillon. Still more unfortunate was the reign of Charles II. (1665-1700), under whom another disastrous war was waged against France, and the population of Spain decreased to 8,000,000. The death of Charles, with whom the Spanish house of Hapsburg became extinct, occasioned a war for the succession to the Spanish throne, which both the brothers-in-law of Charles, Louis XIV. of France and Leopold I. of Austria, tried to secure for a prince of their respective families. Charles, in a second will, appointed Philip of Anjou, grandson of Louis XIV., sole heir of all the Spanish monarchy; but Germany, England, and Holland contested the validity of the will, and for 12 years resisted the claim of Philip to the Spanish throne. The generals of the allies, Prince Eugene and the duke of Marlborough, won several signal victories; yet Philip finally maintained himself on the throne, although in the peace of Utrecht (1713) he was obliged to cede Naples, Sardinia, Parma, Milan, and the rest of the Netherlands to Austria, Sicily to Savoy, and

Gibraltar and Minorca to England. Under his reign Aragon, Valencia, and Catalonia lost the last of their constitutional rights. The great affairs of the state were managed by the queen, Elizabeth Farnese, and her minister, Cardinal Alberoni. In Italy, Naples was regained for the infante Carlos in 1735, and Parma for the infante Philip in 1748. Philip's son Ferdinand VI. (1748-'59) was disabled by melancholy from taking any active part in the government. He was succeeded by his step-brother Charles III. (1759-'88), previously king of Naples, an enlightened prince, with whose reign a better era began to dawn. Having signed the Bourbonic family compact with France in 1761, he was involved in the French-English war, in which, as well as in an expedition against Morocco and Algiers in 1775, and in the expensive siege of Gibraltar during a second war with England, the Spanish arms were not successful; but the internal prosperity of the country was greatly promoted by the wise administration of the king, who was assisted by a number of enlightened statesmen, as Aranda, Campomanes, Olavidez, and Florida Blanca; agriculture, commerce, and trade began to revive; and the population during his reign showed a considerable increase. The power of the inquisition was greatly restricted, the Jesuits expelled from all the Spanish dominions (1767), and the boundaries of the empire enlarged by the addition of Minorca, Louisiana, and Florida. He was followed by his son Charles IV. (1788-1808), who at first continued to pursue the reformatory policy of his father, but after 1792 gave himself up to the pernicious influence of Manuel Godoy, duke of Alcudia. At first Spain joined the alliance against the French republic, but was soon compelled to conclude the inglorious peace of Basel (1795), by which St. Domingo was ceded to France. In 1796 Godoy entered with France into the offensive and defensive league of San Ildefonso (for which he received the title of "prince of the peace"), and declared war against England. In 1797 the Spanish fleet was defeated near Cape St. Vincent, Minorca and Trinidad occupied by the English, and all the ports of Spain blockaded. Spain suffered so much from this war, and the financial embarrassment of the country became so great, that Godoy resigned his position as prime minister, although he retained in fact a controlling influence in state affairs. In 1801 Spain commenced, at the instigation of France, a war against Portugal, the ally of England, which was terminated in 1802 by the peace of Badajoz, and resulted in the cession of Olivenza by Portugal to Spain. In 1802 the peace of Amiens was concluded, by which Spain ceded Trinidad to England, Parma to the Cisalpine republic, and Louisiana to France, while the prince of Parma, a descendant of the royal house of Spain, was made king of Etruria. On the reopening of the war between France and England in 1803, France demanded, in accordance with the league of San Ildefonso,

the assistance of Spain, which, desirous of preserving a neutral position, agreed to pay to France a monthly subsidy of 4,000,000 piasters. The capture of several Spanish vessels by the English compelled Spain to declare war against England, Dec. 12, 1804. The fortune of war was once more against Spain, and at Trafalgar, Oct. 21, 1805, the combined French and Spanish fleets suffered a total defeat, and Spain alone lost 12 ships of the line. The misery which these unfortunate wars brought upon Spain led to the formation of a powerful opposition to Godoy, who in his turn, alarmed by the increasing dependence of Spain upon France, made some feeble and fruitless efforts to extricate his country from the alliance. The success of Napoleon in the war against Prussia thwarted these efforts; he demanded and obtained from Spain two auxiliary armies, one of which, consisting of 18,000 men, was sent to Denmark, the other to Tuscany. Spain had also to submit to the disgraceful treaty of Fontainebleau, in consequence of which French troops were marched into the country. The growing opposition to Godoy, in which now the prince of Asturias himself took an active part, led to an estrangement between the king and the prince. A plan of Godoy to flee with the royal family to Mexico was frustrated by an insurrection of the people, which compelled the king to abdicate in favor of the prince of Asturias (March 19, 1808), who ascended the throne as Ferdinand VII. Soon after, however, in a letter to Napoleon, he represented his resignation as compulsory, and revoked it. Both father and son courted the patronage of Napoleon, who, accepting the office of arbiter, invited them to Bayonne, and there extorted from both, as well as from the infantes Don Carlos and Don Antonio, a resignation of their claims to the Spanish throne. Napoleon then called a junta of 150 Spanish and American delegates for the purpose of forming a new constitution, and on June 6, 1808, declared his brother Joseph king of Spain and of India. The new constitution was adopted and sworn to by the king and the delegates, July 6. On July 9 Joseph departed for Spain, where insurrections had already broken out in Navarre, Aragon, Estremadura, Castile, Leon, and Galicia. England, on July 4, made peace with "the Spanish people," recognized Ferdinand VII. as king of Spain, and vigorously supported the insurrection of the Spaniards, which was under the direction of a central junta, sitting first at Aranjuez and later at Seville. The junta, at the head of which was the aged ex-minister Blanca, called into the field half a million of combatants, under Palafox, Castaños, Romana, Ballegueros, and other national leaders, who were supported by English armies under Moore, Baird, Wellington, Beresford, and others. A fierce guerilla warfare was waged throughout the country; Saragossa, Gerona, Cadiz, Taragona, and Valencia were heroically defended. Until 1812 the war was carried on with varying

success; yet the greater part of Spain fell into the hands of the French, who were commanded by Suchet, Soult, Masséna, Marmont, Ney, Macdonald, and other generals, and the Spanish patriots and the English maintained themselves only in the western provinces and in Portugal. But the failure of Napoleon in Russia was soon followed by a retreat of the French from Spain. Soult with 30,000 French troops was recalled; the brilliant victory of Wellington at Vittoria (June 21, 1813) forced the French army to fall back to the other side of the Pyrénées. Only a few strong places remained in their possession, until the bloody victory of Wellington at Toulouse (April 10, 1814) and the capture of that city successfully terminated the Spanish war of independence. The patriotic war rekindled the wish for a liberal constitution. The cortes, which on Jan. 25, 1810, had fled from Seville to Cadiz, completed the new constitution, March 18, 1812. The regency, which was recognized by England and Russia, at once took the oath to acknowledge it. After the termination of the war, the cortes, which, since Jan. 1814, had assembled in Madrid, invited Ferdinand VII., who had been set free by Napoleon, to return to Spain and take an oath to the constitution. Ferdinand returned, but went to Valencia, not to Madrid, and on May 4 declared the constitution null and void. He announced at the same time his intention, not to restore despotism, but to introduce another constitution on a liberal basis. This promise however was not fulfilled; the inquisition was revived, despotism was restored, and most of the reforms introduced under Charles III. were subsequently annulled. Florida was sold for \$5,000,000 to the United States, and the attempt to reconquer the revolted colonies in America was a miserable failure. On Jan. 1, 1820, a military insurrection, under Riego, broke out for the purpose of restoring the constitution of 1812. It spread with great rapidity; several generals, as O'Donnell and Freyre, who were sent out for its suppression, joined the insurrectionists; and on March 7 the king was compelled to proclaim the constitution of 1812, and to convoke the cortes. A new ministry was formed, the press declared free, the inquisition abolished, and within a few days the new order of things was acknowledged throughout Spain. The suppression of a part of the convents and other resolutions passed by the cortes, which met on July 1, provoked the formation of an apostolical junta, which demanded the restoration of the absolute power of the king, of the convents, and of feudal institutions. Even a regency was appointed by the apostolical party at Seu de Urgel, in Catalonia; but the troops of the government drove the regency into France in Nov. 1822, and dispersed all the guerilla bands in the northern provinces in Feb. 1823. In the mean time France, at the congress of Verona (1822), had agreed with the courts of eastern Europe upon an armed intervention in Spain.

The Spanish government was called upon to restore the royal sovereignty and to change the constitution; and when compliance with the demand was refused, a French army of 100,000 men, under the duke of Angoulême, marched into Spain. The Spanish government opposed to them 4 *corps d'armée* under Ballesteros, Mina, O'Donnell, and Morillo, but most of them were soon overpowered and capitulated; Riego, who maintained himself longer than most of the other generals in the field, was made prisoner and hanged. The king was compelled to follow the cortes to Seville, and from thence to Cadiz; but a new regency at Madrid, in the name of the "imprisoned king," restored political absolutism, together with the convents. When Cadiz was closely invested and bombarded by the French, the cortes restored to the king his absolute power, Sept. 28. Ferdinand VII. at once revoked all the decrees of the constitutional government from March 7, 1820, to Oct. 1, 1823, and confirmed those of the regency. All persons suspected of liberalism were persecuted with great severity; the municipal rights of the communities were abolished; and a treaty was concluded with France, which provided for a continuance of the French occupation. Still a great part of the absolutist party considered the king as not sufficiently energetic, and formed a coalition for elevating to the throne his brother Don Carlos. Several insurrections broke out in 1825 and 1826, but they were soon quelled. At the same time Spain was compelled to abandon its last position on the mainland of America, Jan. 22, 1826. In 1830 Ferdinand was prevailed upon by his wife, Maria Christina, a Neapolitan princess, to abolish, by the pragmatic sanction of March 29, the Salic law of the Bourbon family, which excluded the daughters of the king from the throne. In consequence of this change his daughter, the infanta Isabel (born Oct. 10, 1830), became heir to the throne, in place of his brother Don Carlos, who was under the Salic law entitled to the succession. In Sept. 1832, the apostolic party extorted from the king, who was dangerously ill, a revocation of the pragmatic sanction of 1830; but the intrigue was soon discovered, the influence of the party broken, and Maria Christina appointed regent of Spain for the time of the king's illness (Oct. 1832). She surrounded herself with a ministry of *moderados*, and tried to effect a reconciliation with the liberals in order to break the power of the Carlists. Don Carlos himself entered a protest against his exclusion from the throne, which was sustained by the Bourbonic courts of Italy. The death of Ferdinand VII., Sept. 29, was at once the signal for a general civil war. Don Carlos was proclaimed in the Basque provinces as Charles V., and was supported by a majority of the clergy and the country people throughout the kingdom; Maria Christina, on the other hand, had the joint support of the moderados and the liberals. At first the Carlists, under the command of Zumalacaregui, were successful, and the

government of Christina implored the aid of England and France, which allowed recruiting within their states for the Spanish army. Soon afterward an army of 10,000 men was enlisted in England to join the royal troops. The cause of the Carlists began to decline with the unexpected death of Zumalacaregui, June 25, 1835, and still more when Espartero in 1836 assumed command of the royal army in the northern provinces. The government, in the mean while, was compelled to make new concessions to the radical wing of the progressive party (*exaltados*), and to adopt in 1837 the so called modified constitution of 1812. The Carlists, though they received another military leader of eminence in Cabrera, were finally overpowered in 1839, when some of their generals surrendered, and others, with Don Carlos himself, fled to France. Cabrera maintained himself until July, 1840, when he also fled to France, and the Carlist war was at an end. Yet another revolutionary movement broke out in the same year, when the cortes passed a new *ayuntamiento* law, which abolished the former municipal rights of the Spanish towns. Maria Christina found it necessary to appoint Espartero, the leader of the movement, prime minister; soon afterward (Oct. 12) she resigned, and, with the chiefs of the moderados, embarked for France. The cortes in 1841 appointed Espartero regent during the minority of the queen, and Arguelles, an old constitutionalist of 1812, her tutor. The administration of Espartero did more to promote the prosperity of the country than any other before or after him. New roads and canals were constructed, mining encouraged, and industry and trade put on a firmer basis; and the functions of public officers were never discharged with greater integrity. But the sale of the ecclesiastical property called forth an allocution of the pope, in which the confiscation of the church property was denounced as robbery, and the almost unanimous opposition of the Spanish clergy, who, in union with the *moderados* and the *absolutistas*, were strong enough to harass Espartero by insurrections during the entire period of his administration. In May, 1843, an open rupture between Espartero and the cortes, although a majority of them were *progresistas*, was at once followed by a general insurrection throughout Spain, at the head of which were the leading generals of the moderados, as Narvaez and O'Donnell, who had returned from France. Toward the close of July Espartero embarked at Cadiz for England. In October the cortes declared the queen of age, who in the next year formed a ministry of moderados, under the presidency of Narvaez. Christina was recalled from France, her secret marriage with Muñoz, formerly one of her body guards, publicly announced, and negotiations commenced with Rome. In the cortes which met in Oct. 1844, the moderados had a majority, and in the constitution which they adopted (the constitution of 1845) the rights of the cortes were limited, and the trial by jury for offences

of the press and the national militia abolished. The subsequent history of Isabella II., who in 1846 was married to her cousin, Don Francisco de Assis, is especially noted for the frequent change of her ministers, mostly brought about by palace intrigues. In 1847 the queen yielded for a time to the counsels of her favorite, Gen. Serrano, and appointed a ministry of *progresistas*, which promulgated a general amnesty and conferred on Espartero, whom they recalled from England, the dignity of a senator. But before the end of the year the moderados regained the control of the state under the energetic leadership of Narvaez, who however showed a conciliatory spirit, maintained the amnesty, and made no objection to the return of Espartero. A few revolutionary movements, made in 1848 and 1849, by the *exaltados* on the one hand and the Carlists under Cabrera on the other, were easily suppressed. The suspected complicity of the British minister in Madrid, Sir Henry Bulwer, with some of these movements, led to a temporary suspension of diplomatic intercourse with England. Two illicit expeditions against Cuba, in 1850 and 1851, which were prepared by Cuban refugees in the United States, and met with great encouragement in the southern states of the Union, and subsequently the declarations of the American democratic party in favor of an acquisition of Cuba by the United States, disturbed the friendly relations between the two governments, without leading however to any serious complications. Friendly relations with the papal court were reestablished by the concordat of 1851. Narvaez resigned in 1851, and till 1854 a number of short-lived and weak ministries succeeded each other, most of which had reactionary tendencies. In 1854 the progress of illiberal legislation, the financial operations of Maria Christina, her husband Muñoz, and the banker Salamanca, who had wrongfully obtained the most important railroad concessions, and the imposition upon the country of a compulsory loan of 180,000,000 reals, led to a military insurrection, one of the leaders of which was Gen. O'Donnell, who called on all liberal parties to unite and restore the constitution of 1837. On July 24 the queen saw herself compelled to charge Espartero with the formation of a new government. Constituent cortes were called, in accordance with the law of 1837, which met in a single chamber, and elected Espartero their president, Nov. 28; but two days later he was again appointed prime minister. The cortes restored in the main the liberal constitutions of 1812 and 1837, and declared themselves in favor of religious toleration, and for the sale of the church property. A large minority demanded the one chamber system, and that the decrees of the cortes should not need the sanction of the crown. The ascendancy of liberalism lasted until July 14, 1856, when, reactionary influences having again prevailed in the palace, Espartero resigned, and O'Donnell was ap-

pointed prime minister. An insurrection in Madrid and the other large cities was suppressed, and the entire kingdom declared in a state of siege. On Aug. 15 the national guard was dissolved, and gradually the illiberal legislation of 1845 restored, especially since Narvaez had become prime minister. The sale of church property was inhibited, and the concordat of 1851 restored. The church property question was finally adjusted by a convention with Rome, on Aug. 25, 1859; and the Spanish government not only continued to remain on good terms with the papal court, but, after the union of a part of the papal territory with the kingdom of Italy in 1860, became the strongest supporter of the temporal sovereignty of the pope. In 1857 diplomatic relations with Mexico were broken off, and in Dec. 1858, the government announced to the cortes that, all efforts to obtain from Mexico a redress of the Spanish grievances having failed, proper measures would be taken to enforce the Spanish claims. Subsequent negotiations with France and England, which complained of similar grievances, led in 1861 to the conclusion of a tripartite treaty, in accordance with which the three governments toward the close of the year sent an expedition against Mexico, to obtain satisfaction. The castle of San Juan de Ulloa and Vera Cruz surrendered to the Spanish squadron under Gen. Gasset without a struggle (Dec. 14-17). Several months before Spain had increased her dominions in America by resuming possession of her former colony of St. Domingo. On March 18 the last president of that republic, Santana, issued a proclamation announcing the union of the state with Spain, and on May 20 the queen signed the decree by which the annexation was accepted. In 1858 Spain united with France in sending an expedition against the emperor of Anam, who had for years cruelly persecuted the native Christians, and, as was alleged, violated former treaties with the two governments. They conquered part of the coast of Anam; but in Dec. 1861, the war had not yet been brought to a close. On Oct. 22, 1859, war was declared against Morocco, which, as was alleged, had attacked the Spanish possessions situated on the N. coast of that empire. The war, in which the Spanish troops were commanded by Gen. O'Donnell, was brief and very successful. At the peace, which was concluded April 26, 1860, Morocco agreed to pay an indemnification of 20,000,000 piasters, to accord to Spanish trade the same rights as to that of the most favored nations, and to allow a Spanish ambassador and a Catholic bishop to reside at Fez. These foreign wars led to a considerable increase of the army and navy, promoted peace at home, and greatly raised the reputation and influence of Spain abroad. The count of Montemolin, the eldest son of Don Carlos, in whose favor the latter had in 1845 abandoned his claim to the Spanish throne, made in 1860 another attempt to overthrow the gov-

ernment of the queen, but it soon ended in his arrest and that of his brother Ferdinand. The two princes were set free after having signed a declaration that they abandoned their claims. Soon after their liberation they revoked this declaration, but the prospects of the Carlist party were at the end of 1861 more hopeless than ever before.—Among the best histories of Spain are those of Mariana (with continuation by Sabau y Blanco, 20 vols., Madrid, 1817-'22), Bossi (8 vols., Milan, 1821), and Lembke and Schäfer (in the collection of Heeren and Ukert, 5 vols., 1861). The most valuable illustrations of Spanish history are by foreign hands, and may be found in the works of Prescott, Irving, Ticknor, Mignet, Watson, Robertson, Cox, Dunlop, Southey, Stirling, and Ford.

SPAIN, LANGUAGE AND LITERATURE OF. Of the language of the primitive inhabitants of Spain, the Iberians and Cantabrians, who probably did not belong to the Indo-European nations, but early mixed with the Celts, only a feeble offshoot survives in the Basque. The modern Spanish contains but few words which can be traced to an Iberian, Cantabrian, or Celtic source. It sprung, like the other Romanic languages, from the vulgar Latin, which seems at an early period to have driven out altogether the primitive languages. As in its sister languages of the Romanic family, the Italian, French, and Portuguese, the basis has remained thoroughly Latin, though with many modifications, while the influence of the Teutonic is apparent in the formative part of the language. The following are some of the important changes which this amalgamation has produced: The vowels *e* and *o* of the accented penultima have very frequently developed themselves into the diphthongs *ie* and *ue*, as in *bueno*, *fuerte*, *puente*, *tiempo*, from *bonum*, *fortem*, *pontem*, *tempus*. Harsh consonants show a tendency to soften, and combinations to change themselves into single consonants, as in *abrir*, *saber*, *dirgo*, *agua*, *edad*, from *aperire*, *sapere*, *dico*, *agua*, *etatem*. Combinations with *l* are generally changed into the beautiful Spanish sound *ll*, as in *llave*, *llama*, *llano*, from *clavis*, *flamma*, *planus*; *cl* and *et* pass into *ch*, as in *noche*, *dicho*, from *noctem*, *dictum*; initial *f* is changed into mute *h*, as in *hacer*, from *facere*. The *d* in the middle of a word between two vowels has often been dropped, as in *creer*, *fiel*, from *credere*, *fidelis*; and a *b* or *d* is, as in cognate languages, inserted where *m*, *n*, or *l* would meet with *r*, as in *nombre*, from *nomen*; *tendré*, future of *tener*; *saldré*, future of *salir* (compare Fr. *nombre*, Eng. *number*, Gr. *arabos* instead of *avpos*). The introduction of the strong gutturals, which are represented by 8 signs, *g*, *j*, and in a few cases *x*, is also to be ascribed to Teutonic influence. In words beginning with *s* followed by another consonant, a euphonic *e* has been invariably prefixed, as in *estar*, *espíritu*, *escudo*, from *stare*, *spiritus*, *scutum*. *Ni*, *ne*, *nn*, and *gn* have been often changed into the liquid *n* (*ñ*), as in *España*,

*entrañas, año, leño*, from *Hispania, intranea, annus, lignum*. The inflections of the noun and the verb show a marked influence of the Gothic. The refined system of declension seems to have been too complicated for the northern barbarians; they used only one case ending for each of the singular and plural numbers, and this ending was in the singular supplied, not by the Latin nominative, but by the accusative, with the rejection of the consonantal ending *m*, and sometimes of the syllable ending *em*. Thus the Latin *nix, dux*, and *virtus* pass into *nieve, duque, and virtud*; but the neuter nouns *corpus, tempus*, and *caput* form *cuerpo, tiempo*, and *cabo*. The loss of cases was remedied by the use of the article, not unknown to the Goths, and obtained from the vulgar Latin, in the shape of the demonstrative pronoun *ille* and the numeral *unus*. In the verb also the Spanish has lost many terminations of persons and tenses, and to supply this loss it has introduced the use of personal pronouns before the verb, and the more frequent employment of the auxiliary verb. The composition of the future (*amaré* instead of *amar he*, I have to love), and the expression of the passive voice by means of the auxiliary verbs, are the most remarkable instances of the influence of the Gothic. The words of Teutonic descent are calculated to amount to about  $\frac{1}{5}$  of the whole number, many of which refer to war and strife, or to peculiarities of the Teutonic race. From the Arabs, who first landed on Spanish soil in 711 and maintained themselves until 1492, the Spanish language received that oriental character which distinguishes it among the Romanic languages; but on words and forms the influence of the Arabic was slight. The sound *s* (similar to the English *th*), especially in the syllables *sa, so, su*, is of Arabic origin; so are most of the words beginning with *al* (the Arabic article), some of which, as *almanac, alcohol*, &c., have passed through the Spanish into all the modern languages of Europe. Among the numerous dialects simultaneously developed from the amalgamation of the Latin and the Gothic languages, the Castilian gradually gained the ascendancy, and has become established as the language of Spain. All the other dialects have perished in the course of time, with the exception of the Portuguese, which, in consequence of the political separation between Spain and Portugal, has retained its independence. The territory of the Spanish language is one of the most extensive of the world, embracing Mexico, the largest part of the West Indies, Central and all South America except Brazil and Guiana, some portions of Africa, and the Philippine islands.—The Spanish language has 27 letters or signs of as many distinct sounds. Two of these, the liquids *ll* and *ñ* (pronounced like *lli* in *brilliant* and *ni* in *union*), are peculiar to the Spanish. All letters are pronounced except *h*, which is mute. The 6 vowels do not change in sound, like English vowels, but have always the same

pronunciation, which agrees with that of the Italian. The substantives have only 2 genders, masculine and feminine; but the article has 3 forms, *el, la*, and *lo*, the last of which is used for changing adjectives into substantives, as *bueno*, good, *lo bueno*, that which is good. The plural is formed by adding to the singular either *s*, as *libro, libros*, or *es*, as *mesa, ley, rubí*, pl. *meses, leyes, rubies*. A declension proper does not occur, the inflections of the Latin having been lost, and being replaced by the use of prepositions, especially *de* and *á*. The Spanish is uncommonly rich in augmentative and diminutive terminations, which have gradually become the regular and exclusive means of adding to the original meaning of words the expression of great or small size and feelings of admiration or contempt. The comparative is formed by prefixing to the positive the adverb *mas* (Latin *magis*, more), and the relative superlative by adding to the comparative the definitive article; as *grande*, large, *mas grande*, larger, *el or la mas grande*, the largest. But the Spanish has over the kindred idioms of Italy and France the advantage of having retained from the Latin an absolute superlative, which is formed by the addition of the ending *ísimo*. In the verb, the subjunctive has 2 more simple and 2 more compound tenses than the kindred languages, viz.: future, 2d conditional; future perfect, and conditional perfect. The number of conjugations has been reduced to 3, as the formation of the infinitive by discarding the final *e* of the Latin infinitive effaced the distinction between the 2d and 3d Latin conjugations. The Spanish has also, alone among the Romanic languages, a double set of auxiliary verbs, *haber* and *tener*, *ser* and *estar*, and uses the reflexive form of the verb more extensively than any other language of Europe. The most important of the native grammars are those of the Spanish academy and of Salva; of foreign ones, those of Keil, Fuchs, Wiggers, and Schele de Vere (New York, 1854). The best material for a historical grammar is found in Diez, *Grammatik der Romanischen Sprachen*. Among the dictionaries, that of the Spanish academy (1771), the etymological dictionary of Cabrera (Madrid, 1837), the Spanish-German by Seckendorff (3 vols., Hamburg, 1828), and the Spanish-English of Neuman and Baretti, revised by Velazquez (New York, 1852), are especially valuable.—LITERATURE. The literary life of the Spanish people began under the rule of the Romans, when Spain became a chief seat of Roman civilization, and produced many of the greatest writers of Latin literature. After the Christianization of Spain and S. W. Europe in general, ecclesiastical literature found, next to Italy and Gaul, its most fertile soil in Spain. After the invasion by the Arabs, Arabian literature attained a high degree of prosperity, and the numerous Jews cultivated Hebrew literature with great success. The national literature of Spain begins in the 12th century with epic and didactic poems in Castilian verse, and resting on

strong national sentiments as a basis. The first of these poems in age as well as in importance is the one commonly called the "Poem of the Cid," composed in the 2d half of the 12th century. Its subject is taken from the adventures of Ruy Diaz, surnamed the Cid, the popular hero of the chivalrous age of Spain, and the defender of his nation against the Moorish invaders. It partakes of both the historical and the mythical character, and in its execution is one of the grandest poetical productions of the middle ages. Before this Spain had many popular songs, both of lyric and epic character, but we know little of their original form, as they were not written down before the 16th century. The single manuscript which has preserved the "Poem of the Cid" contains 8 other poems, all like that anonymous, viz.: "The Book of Apollonius, Prince of Tyre," "The Life of our Lady, St. Mary of Egypt," and the "Adoration of the Three Holy Kings." These poems, as well as the rhymed "Lives of Saints" by the priest Gonzalo of Berceo (died about 1260), and the anonymous poem of "Count Fernan Gonzalez," a hero of the earlier period of the Christian conflict with the Moors, who is to the north of Spain what the Cid became somewhat later to Aragon and Valencia, betray the influence of the ecclesiastical poetry of those times and of the chivalric poetry of France. They are written either in stanzas of Alexandrine verse or in the indigenous rhythm of the *redondillas*. A great impulse to the development of literature was given by King Alfonso the Wise of Castile, who substituted the Spanish language for the Latin in the courts, and ordered the laws to be published in it. Alfonso himself was a prolific author. In order to bring uniformity into the different systems of Spanish legislation, he compiled several codes of laws, the most celebrated of which has the title *Las siete partidas*. Several historical works, as a universal history of the world, a history of the crusades (*La gran conquista de ultramar*), and the celebrated *Cronica general*, a general history of Spain until the death of his father, were compiled under his direction. By these works, as well as by a translation of the Bible into Spanish, he became the creator of Spanish prose. Some of his poetical works have also considerable merit, though in general they are most remarkable for the variety of their metres, some of which were first introduced by Alfonso into Spanish poetry. Alfonso found many imitators, as author and patron of literature, among the succeeding kings and the princes of the royal family. The most important of these works of royal origin is "Count Lucanor" (*El Conde Lucanor*), by the infante Don Juan Manuel (died 1347), a collection of 49 tales, anecdotes, and apologues, clearly in the oriental manner, and partly taken from oriental sources. The most remarkable poet of the 14th century is Juan Ruiz, commonly called the archpriest of Hita (died about 1351). His works, em-

bracing religious and erotic songs, fables, pastoral songs, &c., consist of nearly 7,000 verses; and although generally written in the 4-line stanza of Berceo, they contain no fewer than 16 metrical forms, some of which are taken from the Provençal. The didactic tendency prevailing in the poetry of this period is also apparent in the "Book of Rabbi Don Santob," a curious poem, addressed by a Jew of Carrion to Pedro the Cruel on his accession to the throne, for the purpose of giving to him wise moral counsels, which the poet more than once begs him not to undervalue because they come from a Jew. Another didactic poem is "The Dance of Death" (*Danza general de la muerte*), which is founded on the fiction, often illustrated both in painting and in verse during the middle ages, that all men of all conditions are summoned to the dance of death, a kind of spiritual masquerade, in which the different ranks of society, from the pope to the young child, appear dancing with the skeleton form of death. The formation of a courtly school of lyric poets, after the model of the troubadours, had commenced under Alfonso X., who himself wrote lyric poems in the dialect of Galicia. A flourishing school of Provençal troubadours formed itself at the court of the counts of Barcelona, who possessed at different times during nearly 8 centuries portions of territory on both sides of the Pyrénées, and in 1137 obtained by marriage the kingdom of Aragon. A courtly school of Castilian poets sprang up at the court of the chivalric king John II. The poetry of this school was in contents and form very similar to the later Provençal, moving like it within the narrow circle of courtly gallantry and the then *bon ton*, and therefore suffering from monotony and want of ideas. Their works were collected in *cancioneros*, the oldest of which is that of Juan Alfonso de Baena, a converted Jew and one of the secretaries of John II. The most complete collection of the kind, the *Cancionero general* of Fernando del Castillo (Valencia, 1511), contains (in its 10th ed., 1573) the names of 136 authors, some of which go back to the beginning of the reign of John II., while others come down to the time of the emperor Charles V. Among them were the marquis of Villena, the marquis of Santillana, and Mena, who in larger didactic poems tried to imitate classical and Italian models; Diego de San Pedro, who also wrote two love novels (*Carcel de amor* and *Question de amor*); and Guzman, who is also celebrated as a historian. In opposition to the Provençal and the courtly schools, there also began in the 2d half of the 14th century a more popular literature, growing directly out of the enthusiasm which had so long pervaded the whole mass of the Spanish people; and it asserted for itself a place which in some of its forms it has successfully maintained ever since. This popular literature can be distributed into 4 different classes, ballads, chronicles, romances of chivalry, and



the drama. Of most of the old ballads, as far as the time when they were thought worthy to be written down, both authors and dates are unknown. There are in all about 1,000 extant, unequal in length and still more in merit, and they have been collected in the *Romancero general* (13 parts, 1805-'14). The chronicles, or the half genuine, half fabulous histories of the great events and heroes of the national annals, were originally begun by authority of the state, but they were always deeply imbued with the popular feelings and character. Some of them have already been referred to; other works of this class, which evince a steady progress of the historical prose, are the chronicles of Ayala and of Juan Nuñez de Villaizan, the "Chronicle of the Cid," the "Chronicle of the Travels of Ruy Gonzalez de Clavijo," and others. The first and most celebrated of the romances of chivalry is the "Amadis de Gaul," originally the work of a Portuguese gentleman, Vasco de Lobeira (died 1403, according to Ticknor), but translated into Spanish by Montalvo between 1492 and 1504. The Portuguese original can no longer be found; but the Spanish version proved one of the most successful books of this branch of literature, establishing a high reputation in every country of Europe, and having, as Don Quixote said, descendants innumerable. The Spanish drama arose out of the representations so extensively connected with the festivals of the church during the middle ages. Among the best productions of this early period of Spanish literature belong the pastoral plays of Juan de la Encina and the celebrated dramatic novel of *Celestina* by Fernando de Rojas.—The 2d period of the national literature of Spain extends from the accession of the Austrian family at the beginning of the 16th century to Cervantes. Under Charles I. (V. of Germany) Spain became on a sudden, from a second class kingdom of Europe, the most powerful empire of the world; and, as in the history of other countries, the political glory reflected itself in the rapid progress of literature. The union of Aragon and Castile led to the general adoption of the Castilian dialect as the commercial and literary language of the people. In consequence of the conquest of Naples by Gonsalvo de Cordova (1504), Italian literature, at that time the most advanced of Europe, began to have a marked influence on the poetry of Spain. The great Italian models, especially Dante and Petrarch, were imitated, and Italian measures, as the verses of 7 and 11 syllables, and Italian forms, as the sonnets, *ottave rime*, *canzoni*, &c., introduced. The first poet of this class was Juan Boscan Almogaver (died 1543), who was induced by Navagiero, the Venetian ambassador, to make an experiment in Castilian of sonnets and the other forms of verse used by Italian authors. He succeeded in them much better than in his early efforts in *coplas Españolas*. In most of these poems, although they are obvious imitations of Petrarch, a Spanish tone and spirit

are perceptible, which rescue them from the imputation of being copies. His colors are laid on with a bolder hand than those of his Italian master; yet there is an absence of the delicate and exact finish of the original. To a still greater perfection the best forms of Italian verse were carried by a friend of Boscan, Garcilasso de la Vega (died 1536), who, with a happier genius, easily surpassed him. His pastoral poems, which are unexcelled in Spanish literature, are remarkable for gentleness and melancholy, for a pleasing neatness of expression and a rare sweetness of versification. His sonnets, elegies, and epistles are of less poetical value. Among those who aided most in the introduction and establishment of Italian metres was Diego Hurtado de Mendoza (died 1575), distinguished as scholar and soldier, as poet and diplomatist, as statesman and historian. His sonnets are rougher than those of his predecessors, but his epistles (*cartas*) are rich in sentences, portraiture, and characteristics of great excellence. Though counted among the Italian school, he often gave himself up to the old *redondillas* and *quintillas*, and to the national tone of feeling and reflection appropriate to these ancient forms of Castilian verse. His satirical rogues' novel, *Lasarillo de Tormes*, is a work of genius and a perfectly original conception, which has been more or less a favorite in all languages down to our time; becoming in Spain the foundation of a class of fictions essentially national, which, under the name of the *gusto picaresco*, or the style of the rogues, is as well known as any other department of Spanish literature, and one which the "Gil Blas" of Le Sage has made famous throughout the world. His history of the war against the Moriscos in Granada (*Guerra de Granada*) is distinguished for manliness, vigor, truth, and picturesqueness of style. The Italian school of poets of this period includes also several Portuguese who wrote in the Castilian dialect, as Francisco de Saa de Miranda, the author of idyls, and Jorge de Montemayor, the author of the celebrated pastoral novel *Diana*. The two greatest lyric poets that Spain has ever produced were Fernando de Herrera (died 1597) and Luis de Leon (died 1591). Herrera wrote some excellent elegies, and the first classic odes in modern literature. The poetry of Luis de Leon is chiefly religious and deeply imbued with mysticism. The best of his poetical compositions are odes written in the old Castilian measures, with a classical purity and vigorous finish before unknown in Spanish poetry, and hardly attained since. He at the same time ranks among the greatest masters of Spanish eloquence for his prose, which is more rich and no less idiomatic than his poetry. Less original, and at present less known, are Acuña, a lyric poet and skilful translator, and Gil Polo, who ably continued and completed the *Diana* of Montemayor. Epic poetry was on the whole cultivated with but little success, and the attempts to sing the

exploits of Charles V. made by Zapata (*Carlos famoso*), Urrea, the translator of Ariosto (*Carlos victorioso*), and Samper (*Carolea*), were failures. Christoval de Castillejo (about 1580), the most efficient among the early opponents of the Italian school, wrote novels and erotic songs, which are masterpieces of their kind; but the satire with which he inveighed against the innovators was generally too exaggerated to have any effect. Attempts made by Villalobos, Perez de Oliva, and others, to give a new impulse to dramatic poetry by the translation of old classics, had little effect; but the epic elements of the old national novels led at the beginning of this period to the development of a truly national drama, of which Naharro (about 1517) must be regarded as the father. He wrote his comedies in *redondillas*, divided them into 3 acts (*jornadas*), and in general traced out the path in which the dramatic genius of Spain was to attain its highest perfection. He was followed by Lope de Rueda, who, being both a dramatic writer and actor, was the first to establish and regulate the Spanish stage; and by Juan de la Cueva (about 1608), whose plays, mostly on historical subjects, are divided into 4 *jornadas* and written in various measures, including *terza rima*, blank verse, and sonnets, but chiefly in *redondillas* and octave stanzas. The two tragic plays of Geronimo Bermudez, which treat of the sad history of Ines de Castro, are happy imitations of the old classic tragedy. In this period arose also the ecclesiastical plays (*autos sacramentales*), the burlesque interludes (*entremeses y sainetes*), and preludes (*loas*), though their full development belongs to the following period. Prose literature consisted mostly of chivalric novels, formed after Italian originals, and without any intrinsic value or importance for the history of literature. Foremost among the prose writers were Mendoza and Luis de Leon, both of whom have already been named among the poets. Geronimo Zurita, the author of a history of Aragon (*Annales de la corona de Aragon*, 6 vols.), was the first of the Spanish historians as distinguished from the chroniclers, who in particular emancipated the historical literature of Spain from the monkish credulity of the old chronicles. Among the best specimens of didactic prose belong the dialogue of Oliva on the dignity of man (*Dialogo de la dignidad del hombre*) and the essays (*Discursos*) of Morales on subjects of practical philosophy and literature.—The golden era of Spanish literature begins in the 2d half of the 16th century with Cervantes, whose name and works are better known in foreign countries than those of any other Spanish author. His "Don Quixote," an ironical parody of the trashy literature of chivalric novels then so generally in vogue, is the never equalled model of Spanish prose, the oldest classical specimen of romantic fiction, and one of the most remarkable monuments of modern genius. His *Novelas ejemplares* and his *Trabajos de Persiles y Sigismun-*

*da* inaugurated in Spain the literature of serious romantic fiction, in which he found many imitators, none of whom however equalled him. His *Galatea* is one of the best pastoral novels of Spain. The Spanish drama was raised to the elevated position which it occupies in the modern literature of Europe by the prolific Lope de Vega. He fixed its several modifications, and from his times we meet with the division into ecclesiastical and secular dramas (*comedias divinas y humanas*). The principal kinds of the secular drama were *comedias heroicas*, historical and mythological plays, and *comedias de capa y espada*, dramas with cloak and sword, the principal personages of which belong to the genteel portion of society, accustomed in Lope's time to the picturesque national dress of cloaks and swords. The ecclesiastical dramas were divided into *vidas de santos*, lives of saints, and *cantos or autos sacramentales*, plays at the Corpus Christi festival. In point of composition nearly all the dramas of Lope de Vega are alike; the unity of action, time, and place is little or not at all observed; acts and scenes barely connect the whole; language and representation are sometimes vigorous, sometimes weak, now noble, now common and coarse. The number of his dramas is almost fabulous, and is put by Perez de Montalvan, his intimate friend and executor, at 1,800 plays and 400 *autos*. He wrote also several epic poems, as *Jerusalén conquistada*, *Corona tragica*, &c., which were far inferior to his dramas, and were soon forgotten. His minor poems, among which are some of great merit, are almost innumerable. The number of poets at this time increased amazingly, though but few of them showed any originality. Among the lyric poets, the first, as far as their general influence was concerned, were the two brothers Argensola. Many of this class of writers belonged to the school of the *conceptistas*, who expressed themselves in metaphors and puns, alike in the pulpit and in poetry, or to that of the *cultos*, who claimed for themselves a peculiarly elegant and cultivated style of composition, and who, while endeavoring to justify their claims, ran into the most ridiculous extravagances, pedantry, and affectations. The essence of epic poetry was singularly misunderstood, as all epic poems were little more than versified history. Even the best work of the class, the *Araucana* of Alonso de Ercilla y Zúñiga, though not destitute of beautiful epic machinery, is in the main but a record of the conquest of Araucania by the Spaniards. Of all kinds of poetry, the drama was cultivated most and with the greatest success. A last attempt to write plays purely tragical in their character was made by Christoval de Virues, whose *Semiramis* and *Cassandra* were in true expression of tragic pathos and in vigorous dialogue superior to all former efforts; but as the people had a decided preference for the national drama, in which as in life tragic scenes alternate with comic, it did not succeed. All for-

mer and later tragic poets were surpassed by Pedro Calderon de la Barca, one of the greatest dramatists that ever lived. To the originality and overflowing imagination of his predecessors he added a greater depth of reflection and a more careful execution in details. Female characters, in particular, were delineated by him more faithfully and more ingeniously than by any other Spanish poet. In elegance of language and versification he is also unequalled. The most prominent among his numerous successors were Francisco de Rojas, Agustin Moreto, Fragoso, Diamante, Antonio Hurtado de Mendoza, Juan de la Hoz, Antonio de Solis (who is more distinguished as a historian), and Agustin de Salazar y Torres, who somewhat inclines toward the "cultivated style." The decline of Spanish literature shows itself clearly in the works of Francisco de Quevedo y Villegas, the most learned writer of his times, and some of whose works, as his burlesque sonnets and his prose satires, are among the best of their kind in the Spanish language. Though he manfully resisted the influence of the false taste of his times in some of its forms, it is yet no less apparent in others, and excites in him a perpetual desire to be brilliant, to say something quaint or startling, and to be pointed and epigrammatic. Exaggeration and affectation of language vitiate also the otherwise unparalleled erotic songs of Estevan Manuel de Villegas. The corruption of Spanish prose was hastened by the constant stream of bad and shallow novels, in which branch of literature the rogues' novel, *Guzman de Alfarache*, by Mateo Aleman, deserves an honorable mention. The only historians of note were Mariana ("History of Spain") and Solis ("Conquest of Mexico").—The fourth period, which begins with the accession of the Bourbon family (1701), embraces the collapse of the old national literature, the intrusion of foreign elements, their temporary victory over the old Spanish, and the final attempts to regenerate the old native element, and to fuse it with the best elements of modern European civilization. The first prominent advocate of the French element was Ignacio de Luzan, who in his *Poetica* (1737) applied the rules of French critics to native literature, and in his own poems tried to substitute brilliancy for genuine poetry. He was principally opposed by Garcia de la Huerta, whose *Rahel* and *Agamemnon* were written in the old Spanish forms, and were received, in spite of the objections of Gallicizing critics, with immense applause. A middle course was pursued by the school of Salamanca, which endeavored to avoid the excesses of both parties and unite their merits. Its proper founder was Melendez Valdez (born 1754), a poet of eminent talents, whose works exceed all that had been produced in Spain since the disappearance of the great lights of the 16th and 17th centuries, and were received with general enthusiasm as the dawn of a brighter period. Under the influence of the Salamanca school

were also Iglesias, Noroña, Quintana, Cienfuegos, Arriaza, and Gallego, who like Valdez remained thorough patriots in sentiment, though not disdaining to follow great French, Italian, and English models. The liberal and patriotic movements of the years 1812, 1820, and 1834 exercised a very favorable influence on the invigoration of the Spanish mind and the progress of literature. Their fruit is to be seen in the works of Xerica, Lista, Martinez de la Rosa, José Joaquin de Mora, Angel de Saavedra, and Breton de los Herreros. The number of recent poets is very large; among the best of them are reckoned Tapia, Maury, Juan Bautista Alonso, Jacinto de Salas y Quiroga, Espronceda, Serafin Calderon, Zorrilla, Hartzenbusch, R. de Campoamor, Santos Lopez Pelegrin, the satirist Villergas, and Gertrudis Gomez de Avellaneda. The modern age is least successful in epic poetry, and the attempts made by the two Moratins, Escoiquiz, Reinoso, Maury, Saavedra, and others, are not superior to the works of former periods. Better results have been obtained by a recultivation of the old romance and fable, the first impulse to which was given by Saavedra, who has been followed by Mora, Zorrilla, Gregorio Romero y Larranaga, Manuel de Santa Ana, and others. In dramatic poetry, Leandro Fernandez Moratin, a chief representative of the classic school of France, secured for himself a permanent place on the national stage, and for the school to which he belonged a great influence, which lasted until in France the romantic school became powerful. The works of the latter, partly in translations, partly in imitations; controlled for some time the stage of Madrid, but were opposed by Breton, Martinez de la Rosa, Tapia, Saavedra, and more recently by Gil y Zarate, Hartzenbusch, Gutierrez, Escosura, Zorrilla Moral, Trueba, and others. A reformation of prose literature, which had been reduced by the school of the *cultos* to the lowest ebb, was prepared by the Benedictine Feyjoo, who returned to the simplicity of the classic models of Spain, and by the Jesuit Isla, who in his satirical novel *Fray Campazas* ridiculed the trivial and bombastic pulpit eloquence of his times. Ulloa, Muñoz, Capmany, Ferreras, Quintana, Navarrete, Clemencin, Torreno, and Muñoz Maldonado have in modern times distinguished themselves as historians. Among the best political orators were Jovellanos, the Cicero of Spain, Arguella, Minano, Marina, Larra, Alcalá-Galiano, Donoso Cortes, Martinez de la Rosa, &c. Novel literature began to be cultivated with great activity when the standard works of England and France became known. Among the best works of the kind are those of Humara y Salamanca, Escosura, Martinez de la Rosa, Espronceda, Larra, Villalta, Serafin Calderon, and Gertrudis de Avellaneda. In general, Spanish literature is rapidly rising in importance, and there is reason to hope that it will soon occupy again a prominent place among the literatures

of Europe.—The history of science in Spain is much less brilliant than that of the national literature. The rule of the Moors, who founded many schools and academies, promoted the progress of medicine and mathematics. The closer connection with Italy established under Ferdinand and Isabella and their first successors, improved especially the cultivation of philological studies. Toward the close of the 16th century, Spain had 16 universities, 8 of which, Salamanca, Valladolid, and Alcalá, were among the most celebrated of Europe; yet, enjoying less liberty of writing and teaching, they did not keep pace in their development with those of other European countries. Philosophy did not emancipate itself from scholasticism until very recently. A solitary and timid attempt at improving the scholastic method was made by the Cistercian monk Caramuel (died 1682), but it was of no avail. In our times Spain has produced her first great philosopher, Jaime Lucio Balme (died 1849), who wrote a *Curso de filosofía elemental* and several other works. The theological literature of Spain during the middle ages remained behind that of Italy, France, England, and Germany. In the 16th century the philological study of the Bible was somewhat promoted by the Complutensian Polyglot, which was published by order of Cardinal Ximenes, and Melchior Cano earned the reputation of being one of the ablest dogmatic writers of the Roman Catholic church. With this exception Spain has furnished no standard works at all in scientific theology; only in mystic asceticism and in homiletics could the Spaniards compete with other Catholic nations, and the works of Luis de Granada, of Juan de la Cruz, and of Teresa de Jesus in particular, belong still among the standard devotional works of all Catholic nations. In the present century, Balme, already mentioned as a philosopher, is the only theological writer whose reputation has passed beyond the boundaries of his country. Juridical literature began early with the collection of the old law books, already referred to in the history of the national literature. A collection of the ancient codes, with introductions and commentaries by eminent jurists, was published at Madrid in 1847, in 12 vols. In modern times, when Spain had received a constitution, the history of law was cultivated with zeal. A history of the Roman, the canonical, and the Castilian laws was published by García de la Madrid; histories of Spanish law by Zuasnavar y Francia, Quiroga, Ferrer, Antequera, and Quinto; manuals of Spanish law by Alvarez, Fernandez de la Rúa, and Ramon Sala; works on criminal law by Manresa Sanchez and Verlanga Huerta; works on international law by Donoso Cortes, Andres Bello, and Letamendi. Constitutional questions were discussed by Soler and Corradi; the philosophy of law by Alcalá-Galiano and by Donoso Cortes. Works on political economy were especially numerous, and Jovellanos, Cabarrus, Canga-Arguñelles, and Florez have established

in this branch of literature a world-wide reputation. In medical science the Moors and Jews of Spain were very proficient, but it was too long neglected by the Christians. At present Spain is well provided with medical schools, and vies in developing the science of medicine with other civilized countries. The "Bibliographical History of Spanish Medicine," by Morejon, is a valuable work. Natural sciences and mathematics are favorite studies with the Spaniards, and have been greatly advanced by the establishment of a royal academy of mathematical and natural sciences at Madrid, in Feb. 1847. The geographical and statistical literature of Spain has always been large, as may be seen from Nicholas Antonio's *Bibliotheca Hispana Vitus et Nova* (4 vols. folio, 1787), and is still numerous, though mostly confined to Spain and its colonies. Critical research is now promoted by the royal academy of history at Madrid, which, beside its *Memorias* (8 vols., 1796-'52) and *Memorial historico de España* (4 vols., 1851), has published many sources of Spanish history. New critical histories of Spain have been composed by Masdeu (20 vols., Madrid, 1788-1800) and Lafuente (12 vols., Madrid, 1850-'54). The former Spanish colonies of Mexico have also a considerable literature on their history and their wars of independence. Among them are works on Mexico by Mora, on Venezuela by Baralt and Ramon Diaz, on the Argentine confederation by Pedro de Angelis, and on Chili by Eyzaguirre. Special works on single periods of Spanish history or on celebrated personages have been written by Carvajal, San Miguel, Pacheco, Ferrer del Rio, Amador de los Rios, Pastor Diaz, and F. Cardenas. The Spanish revolutions and civil wars of the present century are treated of in the celebrated work of Toreño, the memoirs of the marquis de Miraflores, a classic work of Maldonado, &c. Philology was never very flourishing in Spain, and few philological works of Spaniards have become known in other European countries. The Latin grammar (*Minerva*) of Francisco Sanchez, which was for some time a standard work in all Europe, forms an exception. In modern times, the philologists Estala, Goya, Canga-Arguñelles, Valbuena, Simon Abril, and Ortiz have produced works of some merit, but none of them has yet gained in the republic of letters as firm a reputation as the great scholars of Germany, France, or England. Among the most celebrated philologists of modern Spain are the orientlists Casiri and Gayangos. The interest in scientific literature has been greatly increased during the present century by the publication of several cyclopædias, as *Enciclopedia Española del siglo XIX.* (Madrid, 1842 *et seq.*) and *Biblioteca universal de instruccion* (Barcelona, 1842 *et seq.*); and by the establishment of scientific journals, as *Revista Española*, continued under the name of *Revista Europea* and *Revista de Madrid*. Good bibliographical works have been recently prepared by Fuster, Torres Amat, Ochoa, Ferrer

del Rio (*Galeria de la literatura Española*, Madrid, 1845), and others.—The best work on the national literature of Spain is that of George Ticknor (3 vols., New York, 1849-'54), translated into Spanish with additions by Gayangos and Vedia. A more recent production is the *Studien zur Geschichte der Spanischen und Portugiesischen Nationalliteratur*, by Ferdinand Wolf (Berlin, 1859). Among older works, the German of Bouterwek and the French of Sismondi are especially valuable; they have been translated both into Spanish and English. A standard work on the history of the dramatic literature of Spain is Schack's *Geschichte der dramatischen Literatur und Kunst in Spanien* (3 vols., Berlin, 1845-'6). The modern poets of Spain are treated of in Avelina de Orihuela's *Poetas Españoles y Americanos del siglo XIX.* (Paris, 1851) and Kennedy's "Modern Poets and Poetry of Spain" (London, 1852).

SPALATO, or SPALATRO (anc. *Spolatum*), an Austrian seaport in the province of Dalmatia, capital of the circle of the same name, finely situated on a bay of the Adriatic, formed by the islands which line the coast; pop. 10,300. The town is not well built; the houses are small, and the streets narrow, crooked, dirty, and badly paved. It is the see of an archbishop, and has a large trade, especially with Turkey, in smoked and salt meats, oil, wine, silk and woollen goods, and leather. There are manufactures of candles, rosoglio, and brandy. The harbor is spacious and secure. There is here a vast palace, built by the emperor Diocletian before he had abdicated the empire, which is still in tolerable preservation. It encloses rather more than 8 acres; the S. side, which faces the harbor, is 598 feet in length, and the E. and W. sides each 705 feet. The temple of Jupiter, one of the edifices of the palace, is now the cathedral, and the temple of Æsculapius a baptistery. It has also a lazaretto, and hot sulphur springs of some repute. The city became important after the destruction of the neighboring town of Salona by the Avars about 640; in later times it belonged for several centuries to Venice, and at the beginning of the 19th century to France.

SPALDING, a W. co. of Georgia, formed since 1850, bounded W. by Flint river and drained by branches of the Ocmulgee; area, 250 sq. m.; pop. in 1860, 8,699, of whom 3,819 were slaves. It is intersected by the Georgia central railroad. Capital, Griffin.

SPALDING, LYMAN, an American physician and surgeon, born in Cornish, N. H., June 5, 1775, died in Portsmouth, N. H., Oct. 30, 1821. He was graduated at Harvard university in 1797, and commenced the study of medicine. In 1798, while still a student, he assisted Prof. Nathan Smith in establishing the medical school at Dartmouth college, collected and prepared a chemical apparatus, delivered the first course of lectures on chemistry at the opening of that institution, and published "A New Nomen-

clature of Chemistry, proposed by Messrs. De Morveau, Lavoisier, Berthollet, and Fourcroy, with Additions and Improvements" (1799). His medical studies were afterward continued at the medical schools of Cambridge and Philadelphia, and he entered upon the practice of medicine at Portsmouth, N. H., in 1799. He devoted much attention to the study of the human structure, was a very skilful anatomist, and his admirable anatomical preparations, particularly of the lymphatics, are now in the cabinets of our first institutions. In 1812 the college of physicians and surgeons of the western district of the state of New York, at Fairfield, Herkimer co., was incorporated, Dr. Spalding being elected president and professor of anatomy and surgery, and he made annual visits to this school. In 1813 he removed to the city of New York, and a few years later resigned his position at the college. With Dr. Spalding originated the plan for the formation of the "Pharmacopœia of the United States," by the authority of all the medical societies and medical schools in the Union. In Jan. 1817, he submitted the project to the New York county medical society; in Feb. 1818, it was adopted by the medical society of the state of New York, and ordered to be carried into execution by their committee, Dr. Spalding being one of the number. All the medical schools and societies appointed delegates, who at once commenced their labors, and the first edition of the work was published in 1820. To keep pace with the advancement of medical science, a new edition is published every 10 years. Dr. Spalding was a contributor to the "New England Journal of Medicine," the "New York Medical Repository," *Le nouveau journal de médecine* of Paris, and other medical and philosophical journals; and beside several lectures and addresses, he published "Reflections on Fever, and particularly on the Inflammatory Character of Fever" (1817); "Reflections on Yellow Fever Periods" (1819); and "A History of the Introduction and Use of Scutellaria Lateriflora as a Remedy for preventing and curing Hydrophobia" (1819). Dr. Spalding was active in introducing into the United States the practice of vaccination as a preventive of the small pox. He was a trustee of the only free schools which New York then possessed, and aided in the establishment of the first Sunday schools in that city.

SPALDING, SOLOMON. See MORMONS, vol. ix. p. 735.

SPALLANZANI, LAZARO, an Italian naturalist, born at Scandiano, in the duchy of Modena, Jan. 12, 1729, died Feb. 12, 1799. His studies were directed at Reggio by the Jesuits, and at the university of Bologna by his relative the celebrated female professor, Laura Bassi. Abandoning the profession of law for the pursuits of learning, he was chosen in 1754 to fill the chair of logic, metaphysics, and the Greek language in the university of Reggio. Declining other invitations, he accepted in 1761

a professorship at Modena, and began to obtain a wide reputation by his researches in natural science. In 1766 he maintained, in opposition to Buffon and Needham, the animality of the infusoria; in 1766 he produced a work on the phenomena of generation, showing the preëxistence of germs to fecundation; in 1768 he published the result of his investigations on the production and circulation of the blood; and in the following year translated Bonnet's *Contemplations de la nature*. He was called in 1781 to the professorship of natural history in the university of Pavia, in which office he remained till his death. His observations and discoveries, made known in separate treatises and in the "Transactions" of learned societies, were so important, that Haller dedicated to him the second volume of his work on physiology. In order to add to the museum of Pavia, he travelled at different times through the principal countries of Europe, resided 11 months in Constantinople in 1785, triumphantly vindicated himself against a charge, made by his enemies in his absence, of having stolen specimens from the museum, and on his return lectured to more than 500 students. In later publications he announced remarkable discoveries and theories concerning volcanoes, discussed curious problems in regard to swallows, and suspected the existence of a sixth sense in bats, by which they are guided with precision though deprived of sight. His works are numerous, and many of them have been translated into the principal European languages.

**SPAN WORM.** See **CANKER WORM**, and **CATERPILLAR**.

**SPANDAU**, a strongly fortified town of Prussia, in the province of Brandenburg, situated at the junction of the Spree and Havel, 12 m. N. from Potsdam; pop. 9,497,  $\frac{1}{2}$  of whom are military. The town is entered by 8 gates, and has 3 suburbs. It has manufactories of arms, cloth, ribbons, silk, and leather, and several breweries and distilleries. It was captured by the Swedes in 1631, and by the French in 1806. Spandau is the state prison of Prussia, and bears a much stronger resemblance to a barrack than an ordinary town.

**SPANGENBERG**, **AUGUST GOTTLIEB**, a German divine, and the pioneer and first bishop of the Moravian church in America, born at Klettenberg, in the former principality of Hohenstein, July 15, 1704, died at Berthelsdorf, Saxony, Sept. 18, 1792. In 1722 he entered the university of Jena with the intention of studying law, but was soon induced to devote himself to theology. While pursuing his theological studies he became acquainted with Count Zinzendorf, and through him with the Moravian church. After graduating in 1726, he began to lecture as a junior professor, and in conjunction with a number of students established free schools in the suburbs of Jena for the children of the poor. In 1731 he was appointed to a professorship in the university of Halle, and assistant superintendent of Francke's orphan house. His liberal

views in respect to such as were not in connection with the established church, and especially his strong love for the Moravians, who had bitter enemies at the university, brought him into frequent collisions with his colleagues, until at last his opponents, in 1733, succeeded in having him dismissed from his offices by a mandate of the king of Prussia. Spangenberg proceeded to Herrnhut, in Saxony, the chief seat of the Moravian church, with which he united, and to whose service he now devoted himself. He was appointed assistant to Count Zinzendorf, and in this capacity visited various parts of the European continent. Toward the close of 1734 he went to England, where he entered into successful negotiations with the trustees for Georgia relative to a Moravian settlement in that colony. Fifty acres of land were granted him, and 500 acres were made over to Count Zinzendorf. One of these tracts formed a part of the present site of Savannah, and the other lay on the Ogeechee river. Spangenberg at the head of a company of 9 immigrants arrived at the former tract in the spring of 1735, and immediately commenced a settlement, which was the first formed by the Moravians in America. Having spent 4 years partly in Georgia and partly in Pennsylvania, where he preached as an itinerant evangelist among his German countrymen, he returned to Europe. His report upon the state of religion in Pennsylvania induced the church to begin an enterprise in that province, and the town of Bethlehem, in the present Northampton co., was founded. In 1744, after having been consecrated a bishop, he returned to America, in order to superintend the entire work of the Moravians in this country, in which he continued for 18 years, interrupted by occasional visits to Europe, with untiring energy and courage, amid the trying circumstances of a new country, and the horrors of a protracted Indian war. He undertook frequent journeys to the Indian country, and was adopted into the Oneida nation, and into the tribe of the Bear, receiving the name of Tgirihontie (a row of trees), by which he was universally known among the Indians, and greatly respected. A large tract of land in western North Carolina (nearly the whole of the present Forsyth co.) having been purchased by the Moravians, Spangenberg, in the autumn and winter of 1752, superintended its survey, and thus became the pioneer of the church and civilization in that dreary wilderness. During the Indian war which broke out in 1755, the Moravian missionaries on the Mahoning, in the present Carbon co., having been massacred (Nov. 1755), Bethlehem became the frontier settlement, all the farms to the north and west of that town being forsaken, and hundreds of fugitives filling the place. Spangenberg caused stockades to be erected, employed the Christian Indians as guards, and thus preserved the whole southern country as far as Philadelphia from attack. War parties frequently approach-

ed the town, but seeing its defences never ventured to assail it. Soon after the conquest of Canada, Spangenberg was appointed a member of the college of bishops and elders elected, subsequently to Count Zinzendorf's death, to govern the three provinces and the missions of the Moravian church. He left America in June, 1762, arrived at Herrnhut in November, and immediately entered upon the duties of his new office, and for 30 years was the leading spirit among his colleagues. Bishop Spangenberg's literary labors were very extensive. Among his principal works are a voluminous "Life of Count Zinzendorf" (8 vols., 1776), and *Idea Fidei Fratrum* (1779). The latter is the standard of theology among the Moravians. It was translated into English by Latrobe in 1784, under the title of "An Exposition of Christian Doctrine as taught in the Protestant Church of the United Brethren."

SPANHEIM, EZECHIEL, a Swiss scholar and diplomatist, born in Geneva, Dec. 7, 1629, died in London, Nov. 7, 1710. He was educated under Salmasius and Heinsius at the university of Leyden, from which he was called in 1651 to the professorship of belles-lettres in his native city. He was chosen by the elector palatine for tutor to his son, and in 1659 was sent on an important mission to Italy, where he devoted his leisure to antiquarian and numismatic studies. He returned to Heidelberg in 1665, and was minister resident of the elector successively in Holland and in England. He subsequently entered the service of the elector of Brandenburg, and was for nearly 9 years his extraordinary ambassador to the court of Louis XIV. From 1689 to 1697 he was occupied with his favorite studies at Berlin, but after the peace of Ryswick returned as ambassador to Paris. In 1702, the elector of Brandenburg having been crowned as king of Prussia, Spanheim was created a baron, and was sent as ambassador to England, where he remained till his death. He was profoundly erudite in the political history and numismatics of antiquity, and his most important publications were: *Dissertationes de Præstantia et Usu Numismatum Antiquorum* (4to., Rome, 1664; best ed., 2 vols., London and Amsterdam, 1706-'17), and *Orbis Romanus* (London, 1704; contained also in Grævius's *Thesaurus*, vol. xi.).

SPANIEL (*canis extrarius*, Linn.), a well known variety of hunting dog, in form a small setter, with silky hair, long in some parts of the body, and long, soft, pendulous ears. It was known in ancient times, is figured on some of the later monuments, and was probably the *C. Tuscus* of the Latins; it probably originated in Spain, whence the name. The colors are various, black, brown, pied, liver-colored and white, and black and white. The English breed is considered the best for sportsmen, being strong, with an excellent nose, and fond of the water. The spaniel is very docile, intelligent, devotedly attached to its master even though harshly treated, never deserting him in

trouble or misery, and capable of dying of grief on his grave. There are several varieties, valued for various purposes of use or fashion. The water spaniel differs from the common breed in the eagerness to hunt and swim in water, whence it is used to drive ducks into the nets in decoy ponds; the hair is also harsher. (See POODLE.) The Alpine or St. Bernard spaniel is the largest and most celebrated of the race, being 2 feet high at the shoulders, and 5 or 6 from nose to end of tail; it has a peculiar appearance about the inner angle of the eyes, due probably to being kept partly shut to avoid the high winds and the glare of the snow in the elevated regions in which it lives; this is one of the breeds which searches the mountain passes in the vicinity of the hospices of St. Bernard in quest of bewildered or weary travellers, bearing warm clothing and cordials attached to their bodies; the other breed used for the same purpose has been noticed under DOG. The Newfoundland dog resembles the Alpine spaniels; it is of large size and great strength, and is probably their indigenous American representative, and useful for many purposes of a beast of burden; it is gentle, very intelligent, and affectionate; it is an excellent swimmer, the toes being partly webbed. The springer is a small spaniel of elegant form, small head, and long ears, usually red and white, the latter predominating, with a black nose and palate; the Marlborough breed is considered the best, and specimens have been sold as high as \$300 or \$400. The King Charles spaniel is a small and beautiful breed, prized as ladies' pets, generally black and white, or black and tan-colored; the hair is soft and silky, the ears pendulous, the forehead elevated, and the eyes intelligent, though the temper is generally spoiled and the animal useless to its owner and a nuisance to others, from improper feeding and unnatural habits and training; the variety prized by Charles I. of England was wholly black; this is the *C. brevipilis* (Linn.). It is supposed to be the parent of the cocker, a sprightly little bird dog, usually black, or white with reddish spots, and comparatively shorter in the back than the spaniel. The Maltese dog is perhaps the most ancient of the small spaniel races, being figured on Roman monuments, and mentioned by Strabo as the *C. melitæus*; the muzzle is round, the hair very long and silky, and the color usually white; it is of diminutive size, and fit only for a lap dog.

SPANISH FLY. See CANTHARIDES.

SPANISH MAIN, the appellation formerly given to that portion of the Atlantic ocean, together with the contiguous coast, lying between the isthmus of Darien and the Leeward islands, forming for many years the route traversed by the Spanish treasure ships from Mexico, Central America, and the northern shores of South America.

SPAR. See BARTTA, CALCAREOUS SPAR, FELDSPAR, and FLUOR SPAR.



SPARKS, JARED, an American historian, born at Willington, Conn., May 10, 1789. His boyhood and early youth were passed in agricultural and mechanical occupations, and he was graduated at Harvard college in 1815. During his college course, he taught for a time a small private school at Havre de Grace, Md., and while there served a short time in the militia called out to repel an anticipated attack by the British. He afterward commenced the study of theology at Cambridge, and for two years, 1817-'19, was college tutor in mathematics and natural philosophy. He also became one of an association by which the "North American Review," established in 1815, was conducted. In May, 1819, he was ordained as minister of a Unitarian congregation in Baltimore, and the next year published "Letters on the Ministry, Ritual, and Doctrine of the Protestant Episcopal Church" (8vo., Boston). In 1821 he established a periodical called "The Unitarian Miscellany and Christian Monitor," which he continued to edit during his stay in Baltimore, writing most of it himself. In this work he commenced a series of letters to the Rev. Dr. Miller of Princeton on the "Comparative Moral Tendency of Trinitarian and Unitarian Doctrines," which were afterward enlarged and published in an 8vo. volume in 1823. He also edited a "Collection of Essays and Tracts in Theology, from various Authors, with Biographical and Critical Notices" (6 vols. 12mo.), the publication of which was completed in 1826. His health becoming impaired, he resigned his pastoral charge in 1823, and after spending some weeks in travel went to Boston, purchased the "North American Review" of the owners, and was its sole proprietor and editor for 7 years. In 1828 he published a "Life of John Ledyard, the American Traveller" (8vo., Boston), drawn up almost entirely from materials never before published. He had for some time previous formed the plan of publishing the writings of Washington, with notes and illustrations; and with this view, after extensive researches in the United States, he made a voyage to Europe in 1828, remained there a year, selecting and transcribing documents relating to American history in the public offices of London and Paris, and after his return published "The Writings of George Washington, being his Correspondence, Addresses, Messages, and other Papers, Official and Private, selected and published from the original Manuscripts, with a Life of the Author, Notes, and Illustrations" (12 vols. 8vo., Boston, 1834-'7). During the preparation of this laborious work, he found time to edit and publish two other works illustrative of American history: "The Diplomatic Correspondence of the American Revolution" (12 vols. 8vo., 1829-'30), and "The Life of Gouverneur Morris, with Selections from his Correspondence and Miscellaneous Papers," &c. (3 vols. 8vo., 1832). "The American Almanac and Repository of Useful Knowledge" was started by Mr. Sparks, and

the first volume, for 1830, edited by him. He was also the editor of the "Library of American Biography," of which two series were published (10 vols. 18mo., 1834-'8, and 15 vols. 18mo., 1844-'8), and several of the lives in which were written by him. In 1840 he completed the publication of "The Works of Benjamin Franklin, containing several Political and Historical Tracts not included in any former Edition, and many Letters, Official and Private, not hitherto published, with Notes and a Life of the Author" (10 vols. 8vo.). He then visited Europe a second time, and in the course of his researches in the French archives, discovered the famous map with the red line drawn upon it, about which so much was said in the debates upon the Ashburton treaty in congress and parliament. His long and important labors in illustration of American history were closed in 1854 by the publication of a work entitled "Correspondence of the American Revolution, being Letters of eminent Men to George Washington, from the time of his taking command of the Army to the end of his Presidency, edited from the Original Manuscripts" (4 vols. 8vo.). All Mr. Sparks's historical and biographical writings are distinguished by thorough research, candid judgment, dispassionate criticism, and accuracy and simplicity of style. In 1852 two pamphlets were printed by him in defence of his mode of editing the writings of Washington, in reply to the strictures of Lord Mahon and others, successfully vindicating his course. A similar pamphlet was published the next year, occasioned by a reprint of the original letters from Washington to Joseph Reed. Mr. Sparks was McLean professor of history at Harvard college from 1839 to 1849, and president of the college from 1849 to 1852. In 1857 he made a tour in Europe with his family, and since his return has resided in Cambridge.

SPARRMANN, ANDERS, a Swedish traveller and naturalist, born in the province of Upland about 1747, died in Stockholm, July 20, 1820. At the age of 18 he made a voyage to China, afterward studied medicine and botany under Linnæus at the university of Upsal, and went as a private tutor to the Cape of Good Hope, where he met his countryman Thunberg, and they pursued their studies in natural science together for some time. In 1773 he accepted the offer of the Messrs. Forster, the naturalists of Capt. Cook's expedition, which touched at the Cape, to accompany them as assistant. He was absent 28 months, and on his return commenced the practice of medicine at the Cape, but at the end of 4 months started for the interior of Africa with one companion. He penetrated as far as lat. 28° 30' S., 1,050 miles N. E. from the Cape, to which he returned in about 8 months, with specimens of plants and animals. He returned to Sweden the same year (1776), and on the death of Baron Geer was appointed his successor as conservator of the museum. In 1787 he went to Senegal to join Wadström's

projected expedition to the interior of Africa, but on its failure returned by way of England to Stockholm, where he remained till his death. He published *Amenitates Academicæ* (1771), and narratives of his travels, which have been translated into German and English.

SPARROW, the familiar name of many small birds of the finch family, and the old genus *fringilla* (Linn.), which has been numerous subdivided by modern ornithologists; the family characters have been given under FINCH. Among the many American species may be mentioned 6, distributed under 4 different genera.—The white-crowned sparrow (*zonotrichia leucophrys*, Swains.) is about 7 inches long and 10 in alar extent; the body is stout, bill conical, feet robust, the 2d and 8d quills longest, and the tail rather long and moderately rounded; the chin, throat, and breast are nearly uniform ashy; the head above black; median and superciliary stripe pure white; a narrow black line through and behind the eyes; back and wing coverts dark reddish brown with paler margins; quills and tail darker; wings with 2 white bands; whitish below; bill reddish orange tipped with brown; lower lid white. It is found from the Atlantic to the Rocky mountains and from Labrador to Texas, breeding far to the north; the notes are mellow and cheering, 6 or 7 in number, the first loud and clear, and thence becoming fainter and more plaintive; eggs 5 or 6,  $\frac{1}{4}$  of an inch long, light sea green with brownish mottlings at the larger end; the nest is on the ground or among moss, and the eggs are laid in Labrador from the 1st to the end of June. The flight is low, but swift and long protracted; the food consists of seeds, berries, minute shell fish, and insects; the migrations are performed mostly by day; it is gentle and unsuspicious. The white-throated sparrow (*Z. albicollis*, Bonap.) is about 7 inches long and 9 $\frac{1}{2}$  in alar extent; the chin is abruptly white; superciliary stripe broad, yellow anteriorly and white behind; median head stripe white, with a black one on each side, and a broad black streak behind the eye; edge of wing and axillaries yellow; 2 narrow white bands across wing coverts. It is found in the eastern United States and westward to the Missouri, appearing in groups in the southern states in November and departing in March to the north; it is very active among hedges and thickets; when fat and plump, it affords delicious eating.—The genus *spizella* (Bonap.), which differs from the last in its smaller size and longer forked tail, contains 3 well known northern species. The field sparrow (*S. pusilla*, Bonap.) is about 5 $\frac{1}{2}$  inches long and 8 in alar extent; the bill is reddish; ear coverts, crown, and back rufous, the last with blackish streaks; sides of head and neck, and stripe over eyes, ashy; white below, tinged with yellow anteriorly; quills and tail faintly edged with white, and 2 bands of the same across wing coverts; rump yellowish brown. It is found in eastern North America as far as

the Missouri, remaining in the southern states during winter, going north in March, and arriving in New England toward the last of April. The song is pleasing, resembling the trill of a young canary; it is sociable and peaceful, and very prolific, sometimes raising 3 broods in a year; the nest is on or near the ground, and the eggs appear light ferruginous from the blending of the numerous small dots of this color; it frequents orchards and fields. The cheeping sparrow (*S. socialis*, Bonap.), commonly called chip bird, is 5 $\frac{1}{2}$  inches long and 8 $\frac{1}{2}$  in alar extent; the rump, back of neck, and sides of head and neck are ashy; the back has black streaks with pale rufous edgings; the crown is uniform chestnut, the forehead black with a white median line, a white streak over the eyes and a black one from the bill through and behind the eyes; white below, tinged with ashy on the upper breast; tail and primaries with paler edgings, and 2 narrow white bands across wing coverts; bill black; in the young the crown has narrow blackish lines, and the upper breast and sides are streaked with brown. It inhabits North America from ocean to ocean, very common everywhere, except in woods, in spring, summer, and autumn, going south in winter; it is very social, is found with almost every other species of sparrow, and is so familiar as to enter yards and even piazzas for food. The nest is never made on the ground; the eggs are 4 or 5,  $\frac{1}{4}$  by  $\frac{1}{4}$  of an inch, greenish blue, with slight brown spots at the larger end, and rather pointed at the smaller. The notes are 6 or 7 rapidly repeated and loud "cheeps"; the flight is short, irregular, and rather low. They are great favorites from their gentle, harmless, and confiding disposition, in this resembling the domestic sparrow of Europe; they are the most numerous of the sparrows in New England, but arrive some weeks later than the song sparrow.—The genus *melospiza* (Baird) differs from *zonotrichia* in the shorter and more graduated tail, longer hind toe, shorter and more rounded wings, longer tertiaries, unspotted under parts, and streaked crown. The song sparrow (*M. melodia*, Baird) is 6 $\frac{1}{2}$  inches long and 8 $\frac{1}{2}$  in alar extent; the general tint above is rufous brown, with dark brown streaks and grayish edgings; crown rufous, with superciliary and median stripe of dull gray; white below, breast and sides streaked with dark rufous; no distinct white on wings or tail. It is found from the eastern coast to the high central plains, and is abundant in the south, where it raises 3 broods, making a new nest for each. Though not so handsome as some other sparrows, its song is much sweeter, prolonged, and heard at all hours of the day; it nests both on the ground and in bushes; the eggs are 4 to 6, broad ovate, light greenish white with specks of dark brown; both sexes incubate. The flight is short and much undulated; it goes south in winter, and seldom approaches houses nearer than gardens and orchards; it is very active, feeding on

insects, seeds, and berries.—In *passerella* (Swains.) there is a remarkable elongation of the lateral claws and great size of all, the body stout, wings long and pointed, reaching to middle of tail, the 2d and 3d quills the longest and the 1st equal to the 5th, and the tail nearly even. The fox-colored sparrow (*P. iliaca*, Swains.) is  $7\frac{1}{2}$  inches long and  $11\frac{1}{2}$  in alar extent; the back is dusky brown, margined with ashy, lighter on head, tail, and wing coverts, rufous on the last two; white below, streaked with light brownish red on breast and sides of neck, with a few small blackish ones on the middle of the former; rufous patch on cheeks. It is found as far west as the Mississippi, preferring the northern states and going south in winter; it is seen in small flocks or families in the underwood and along brier-skirted fences; it breeds in Labrador, from which it departs about Sept. 1, reaching the southern states early in November, and returning about April 10. The flight is low, rapid, and undulating; song clear, full, sweet, and prolonged for hours at a time; they are sold as song birds in the Carolinas at 10 to 12 cents each. The nest is on or near the ground, of large size, and the eggs are laid from the middle of June to July 5, 4 or 5 in number, dull greenish with irregular small brownish blotches; it raises but one brood in a season, and employs various artifices to draw intruders away from its nest.—The old world sparrows belong to the genus *passer* (Briss.), in which the wings are moderate, with the 2d and 3d quills rather longer than the 1st, and the moderate tail even or slightly forked. There are about 20 species, residing in cultivated regions, even in the midst of cities; the food consists of buds, seeds, grains, and insects; the nest is in trees or hedges, and the eggs are 4 or 5. The house sparrow (*P. domesticus*, Linn.) is  $6\frac{1}{2}$  inches long and  $9\frac{1}{2}$  in alar extent; in the male the upper part of the head is light brownish gray, the sides of the neck grayish white, throat black, back and wings chestnut and black with a white band across the latter, and lower parts light brownish gray; in the female the head is grayish brown above and the lower parts light brownish gray. It is a very familiar bird, picking up its food from door, window, and farm yard, and often so abundant as to commit serious depredations in wheat fields; though feeding chiefly on grain, they bring up their young on larvae, and a pair is said to destroy about 4,000 caterpillars weekly in the breeding season; yet in some districts of England a considerable sum is paid annually for sparrow heads, under the idea that they are enemies of the farmer; they are generally distributed over northern and central Europe, and are brighter colored in the country than in the cities; they like to flutter in the dust like domestic fowls; the males fight desperately before pairing. They are easily caught in simple traps; the flesh is very delicate, but they are too small for game unless caught in nets; they furnish food for carnivorous mammals and

birds; they have no song, except a single note, loud but by no means agreeable.

SPARROW HAWK, a small bird of prey of the falcon sub-family, and genus *tinnunculus* (Vieill.), which differs from *falco* (Linn.) in having longer tarsi, covered in front with large transverse hexagonal scales. There are about a dozen species, widely distributed over the globe; their flight is very graceful, irregular, with occasional hoverings; they eat small birds like sparrows, mice and moles, lizards, beetles, and grasshoppers; the nest is made of a few loose sticks on a rock or in a hollow tree, and the eggs are 4 to 6. The American sparrow hawk (*T. sparverius*, Vieill.) is one of the handsomest, most active, and abundant birds in the United States, and is found over the entire continent of America. It is 11 to 12 inches long, with an alar extent of 22; the crown is light red surrounded by blue, the latter color showing itself also on the wings; back light rufous, spotted with black; tail darker, with broad black band near the end, tipped with white, and lateral feathers with broad black bars on the inner webs; quills black, with white spots on inner webs; throat and upper neck on sides white, with two black bands on the latter; 3 spots on hind neck, and numerous ones on abdomen and sides, black; white below, tinged with yellowish on breast; the young birds have wider bands of black, and the females longitudinal black lines on the crown and stripes on the tail. The eggs are dark cream or light buff, more or less spotted with brown, nearly spherical,  $1\frac{1}{2}$  by  $1\frac{1}{4}$  inches; both sexes incubate, 2 broods being raised in the south; the pairing time is from February to June, according to latitude. It does not interfere with the poultry yard or game birds; it is common about houses and in the fields, but rare in woods; it stands very erect on some elevated tree, stake, or barn, watching for prey, upon which it darts with great rapidity; it is easily tamed, when taken young. The European sparrow hawk (*T. alaudarius*, Briss.) has been described under KESTREL. The *accipiter nisus* (Pall.) of Europe is also called sparrow hawk; the male is dark bluish gray above, reddish white below with yellowish red transverse bars; the female is grayish brown above, and grayish white below barred with dark gray. The size and habits are about the same in the two species.

SPARTA, or LACEDÆMON, the capital of Laconia, the chief city of Peloponnesus, and the rival of Athens in the history of ancient Greece. It was situated on the right bank of the Eurotas, between the tributaries Cenus and Tiasa, about 20 m. from the sea, in a valley of remarkable beauty and fertility, bounded on the W. and E. by the ranges of Taygetus and Parnon. Enclosed by mountains, it was called by Homer the "hollow Lacedæmon." It was about 6 m. in circumference, consisted of distinct quarters which were originally separate villages, and during its most flourishing period was unfortified, being protected by the natural

ramparts of the valley. Its quarters were Pitane in the N., the favorite place of residence, Cynosura in the S. W., Limnæ in the E., and Messoa between the last two. Ægida, in the N. W., adjoining Pitane, is also mentioned. One of its steepest hills (the northern hill, according to Leake; the hill of the theatre, according to Curtius) was called the acropolis, on which were the temples of Athena Chalcioæus, the tutelary goddess of the city, of Athena Ergane, the Muses, Zeus Cosmetas, and Ares Areia, and many statues in honor of divinities and heroes. In the agora, near the acropolis, and adorned with temples and statues, were the council house of the senate and the offices of the public magistrates, the Persian *stoa* built of spoils taken in the Persian war, and the chorus where Spartan youths danced in honor of Apollo. Two principal streets, named Aphetais and Skias, extended nearly parallel to each other from the agora to the S. E. extremity of the city. Upon the largest of the Spartan heights was the theatre, a magnificent building of white marble, the two wings of which still remain, 430 feet apart, built of massive quadrangular blocks, and forming the most important relics of the ancient city. The private houses of Sparta, and even the palace of the kings, were always simple and unadorned, but it was equalled by few other Greek cities in the magnificence of its temples and statues. Its site is now occupied by two villages, Magula and Psychiko, about one mile apart, by the town of New Sparta, built since the revolution on one of the Spartan hills, and by corn fields and gardens, amid which fragments of wrought stone may be seen cropping from the ground. A careless traveller, it is said, might pass over the site without suspecting that a city had ever stood there.—According to tradition, the Leleges were the most ancient inhabitants, and Lelex the first king, in the vale of the middle Eurotas. Lacedæmon, son of Jupiter and Taygete, married Sparta, third in descent from Lelex, and gave the name of his wife to the city which he founded, and his own name to the people and country. During the mythical era of the Achæan monarchies, Menelaus reigned at Sparta, as Agamemnon at Mycenæ and Diomedes at Argos. After the Dorian invasion and conquest of Peloponnesus, under the Heraclidæ, Sparta fell to Eurysthenes and Procles, the twin sons of the Heraclid Aristodemus; and from that epoch date the long succession of two joint kings, and the distinction between the conquerors, who were called Spartans, and the native Achæans (*Periæci*), who became tributary. At first inferior to Argos, Sparta became the chief of the Dorian powers only after the institutions of Lycurgus had made it a nation of professional soldiers. The introduction of the Lycurgan discipline (not later, according to Grote, than 825 B. C.), the earliest determinable event in its internal history, was followed by aggressions which gradually ex-

tended its sway over the greater part of Peloponnesus. There is no certain personal history of Lycurgus, and his legislation has been called the codification of the usages of the Doric race. It recognized 3 classes of persons: 1, the Spartans, of Dorian stock, resident in the city, alone eligible to public offices, all warriors, supported from the lands around the city which belonged to them, and being disfranchised when they failed to pay their quota to the public mess; 2, the Periæci or Laconians, freemen of the neighboring townships, with no political power, devoted to agriculture and industry, paying rent for their land, and forming bodies of heavy-armed soldiers in war; and 3, the helots, or serfs, bound to the soil, which they tilled for the Spartan proprietors, and sometimes employed both in domestic and military service. The equal division of land into 9,000 lots for Spartans, and 30,000 lots for Periæci, is doubted by Grote; and the number of Spartan citizens diminished from the era of the Persian war, when Herodotus estimated them at 8,000, to the time of Agis IV., when they had dwindled to 700, of whom 100 alone possessed most of the landed property of the state. At the head of the government were two hereditary kings, whose power was gradually restricted till their position was one of nominal honor rather than real authority. The legislative power was exercised by two assemblies, that of the elders and that of the citizens; the former was composed of the two kings and 28 members aged at least 60 years, who were judges in capital cases, and initiated and discussed all measures submitted to the popular assembly; and the latter, composed of all Spartan citizens of 30 years of age and of unblemished character, met once a month, and had the right to approve or reject measures by acclamation, but not to amend them. The ephors, corresponding to the Roman tribunes of the people, and probably of later origin than the age of Lycurgus, were the representatives of this assembly, and during the Peloponnesian war exerted despotic authority, having completely superseded the kings as directors of affairs. The most important part of the legislation of Lycurgus related to the discipline and education of the citizens. The individual was held to exist exclusively for the state, to which he should devote all his time, property, and energies; and every child, therefore, was under public inspection from his birth, and was trained simply with reference to warlike exercises, since mechanical labor, husbandry, and commerce were despised and neglected. If weak or deformed, he was exposed to perish; otherwise, he was taken at 7 years of age from his mother's care, and educated in the public classes, where he was subjected to the severest bodily discipline, to habits of subordination, dexterity, and a terseness of speech which became distinguished as "laconic." At the age of 30 he was allowed to engage in public affairs and to marry, but still

continued under public discipline, took his meals at the public mess, slept in the public barracks, and was released from military service only in his 60th year. Both sexes were subjected to nearly the same rigorous gymnastic training, the aim being not domestic enjoyment or refinement, but the production of a hardy race of citizens. The great men that arose from this discipline were distinguished exclusively for military genius.—Under the Lycurgan constitution Sparta began its career of conquest. The first and second Messenian wars (743–723 and 685–668) doubled its population and territory. Before 600 B.C. it had conquered from the Arcadians the upper parts of the valley of the Eurotas, and after repeated contests compelled Tegea, the capital of Arcadia, to acknowledge its supremacy (560). The long struggle between the Spartans and Argives terminated in favor of the former by decisive victories in 547 and 525. Sparta had now acquired the hegemony of Greece, and Croesus when threatened by the Persians formed an alliance with it as the most powerful Greek state. It twice invaded Attica, and interfered in the affairs of the growing Athenian democracy. At the outbreak of the Persian war, it was by unanimous consent intrusted with the chief command. The battles of Thermopylæ and Salamis in 480, and of Platæa in 479, were fought respectively under the Spartan generals Leonidas, Eurybiades, and Pausanias. According to Herodotus, the Lacedæmonians were represented at Platæa by 5,000 citizens, 5,000 *Periœoi*, and 35,000 helots. The allies, excepting Ægina and the Peloponnesian states, were alienated by the arrogance of Pausanias, and therefore in 476 offered the supremacy to Athens. The hegemony thus passed from Sparta to Athens, and the rivalry of these states modified all the history of Greece till the Macedonian era. A destructive earthquake occasioned a revolt of the helots and the third Messenian war (464–455). The Spartans distrusted and rejected an auxiliary force sent by the Athenians under Cimon, which was the cause of hostilities (457–451), the prelude to the long Peloponnesian war (431–404). This war, in which the opposed Doric and Ionic races exhausted their energies, terminated with the conquest of Athens and with the restoration of the hegemony to Sparta. One of its allies was Cyrus the Younger, and in return it aided him in his attempt to dethrone his brother Artaxerxes. The successes of Agesilaus II. in 398 in Asia Minor had led him to form the project of overthrowing the Persian empire, when he was recalled by a confederacy of Corinth, Argos, Thebes, and Athens, which Persian gold and Greek jealousy had prompted against Sparta. The victories of Corinth and Coronea were counterbalanced by the naval defeat off Cnidus, and the peace of Antalcidas (387), which left it supreme in Greece, deprived it of its cities in Asia Minor. The Spartans exerted unrivalled authority, notwithstanding the alliance of

Thebes and Athens against it in 379, until, in the fatal battle of Leuctra in 371, they were defeated by the Thebans, and, for the first time in their history, by inferior numbers. Invasion followed, Sparta narrowly escaped capture, its army was again defeated at Mantinea in 362, and it was stripped of the dominions which it had acquired from the Messenians, Arcadians, and Argives; and from this time it ceased to be a leading state in Greece. Having incurred the enmity of Philip of Macedon by supporting the Phocians in the sacred war, its losses were confirmed and its power still further reduced by him; but it refused to join the alliance of Athens and Thebes against him before the battle of Cheronea, next to recognize his leadership in the proposed expedition against Persia, and subsequently to join the Achæan league against the Macedonian and Roman supremacy. It prompted an anti-Macedonian movement, which was defeated by the victory of Antipater at Megalopolis in 331. The kings Agis IV. (244–240) and Cleomenes III. (238–220) attempted to revive the ancient virtue by restoring the institutions of Lycurgus, abolishing the ephoralty, cancelling all debts, redistributing the lands, and enlarging the number of citizens; but the defeat of Sellasia (221) by the Achæans and Macedonians followed, and Sparta for the first time fell into the hands of conquerors. From intestine factions sprang the usurpations of Machanidas and Nabis (210–192), after which it was compelled with the whole of Peloponnesus to submit to the Achæan league, until in 146 it fell with the rest of Greece under the dominion of Rome. (See *ATHENS*, and *GREECE*.)

SPARTACUS, a Roman gladiator, of Thracian birth, and leader of a servile rebellion in 73–71 B. C. Originally a shepherd, he became a chief of banditti, and was captured by the Romans on one of his predatory excursions. He was sold and trained as a gladiator, and in 73 persuaded 70 of his associates, Thracians and Gauls, who were in preparation for the games at Rome, to escape with him from the school of Lentulus at Capua. They took refuge in the crater of Mt. Vesuvius, and chose Spartacus for their leader. C. Claudius Pulcher was sent against them with 3,000 men, but was defeated, and his arms became the trophy of the victors. Spartacus now proclaimed liberty to all slaves that should flee to him, and his force was thus so greatly increased that for two years he held the supremacy in Campania, Lucania, Bruttium, and other parts of Italy. At the head of 70,000 men he triumphed over two consular armies in 72, and forced his Roman captives to fight as gladiators at the funeral games which he celebrated. His army increased to 100,000 men, the consuls were again defeated, and he meditated an attack upon Rome itself. His own desire was to secure the freedom of the slaves by taking them beyond the Alps, but they, eager for plunder, refused to leave Italy. He for a time maintained his superiority in 71, though 8 legions took the field

under the prætor M. Licinius Crassus. A portion of his force had previously separated from him under his lieutenant Crixus only to be routed, and now the slaves again divided, and were twice defeated by Crassus. Spartacus withdrew to the extreme point of Bruttium, closely pressed by the Romans, and there negotiated with Cilician pirates to take him across the straits into Sicily, where his arrival would have been the signal for reviving the scarcely suppressed Sicilian servile war. The pirates, however, betrayed him; he attempted in vain to cross on rafts; lost 12,000 men in two futile efforts to break through the besiegers; at length effected his escape; and immediately Pompey was summoned from Spain and Lucullus from Thrace to provide for the safety of Rome. But the power of the slaves was broken by jealousy and divisions; the Gauls separated from Spartacus, and were immediately defeated with a loss of 80,000; the followers who remained to him refused to escape to the north; he gained one more victory, attempted in vain to seize the shipping at Brundisium, and perished in battle with Crassus near the head of the river Silarus. Sixty thousand rebels fell in this battle, and 6,000 were made prisoners, and were crucified in the Apian way. The critical investigations of modern historians have led to an appreciation of his character very different from that of the contemporary Roman writers, by whom he was naturally painted in the blackest colors.

**SPARTANBURG**, a N. W. district of South Carolina, bordering on North Carolina, bounded N. E. by Broad river and S. W. by the Ennoree, and intersected by Tiger and Pacolet rivers; area, 950 sq. m.; pop. in 1860, 26,920, of whom 8,241 were slaves. The surface is hilly and the soil fertile. Gold, iron, and limestone are found, and there is a mineral spring at Glenn. The productions in 1850 were 873,654 bushels of Indian corn, 112,993 of wheat, 153,562 of oats, and 80,429 of sweet potatoes. There were 12 machine shops, 9 tanneries, 5 saw and planing mills, 3 foundries, 60 churches, and 1,000 pupils attending public schools. It is intersected by the Spartanburg and Union railroad. Capital, Spartanburg.

**SPEAKER**, a term applied to the presiding officer of each house of the parliament of Great Britain, of the house of representatives of the United States congress, and generally of the lower houses of the state legislatures. The presiding officer of the British house of lords is the lord chancellor for the time being, whose appointment is derived from the sovereign; but the house of commons elects its own speaker, who must be approved by the crown, and who can only speak or vote in committee, except in the case of an equality of votes, when he gives the casting vote. He holds office until the dissolution of the parliament of which he was elected speaker. The house of representatives of the United States elects its own speaker at the first session of each congress,

who holds office until the meeting of the next congress; and in the state legislatures an analogous practice prevails.

**SPEAKING TRUMPET**, a metallic tube with a small end fitted to the mouth, and enlarging toward the wide opening at the other extremity, used for giving greater intensity to the voice, as the sound is forcibly projected through it. Instruments of this sort appear to have been known to the ancient Greeks, and Alexander the Great is reported to have used one in giving orders. They, however, attracted little or no attention afterward until about the year 1670, when Sir Samuel Morland brought the subject before the royal society, and exhibited some instruments of his own construction. They were conical-shaped tubes, suddenly opening out at the large end to a great width. It is stated that Charles II., speaking in his natural voice through one 5½ feet long, was distinctly heard 1,000 yards off; and that another person was understood at the distance of 4½ miles. The principles upon which the action of the speaking trumpet depends are not clearly understood. It has been supposed that the sound gained in intensity by successive reflections from the walls of the tube, and that the aerial undulations which produce it are thus carried forward in a collected body on the line of the axis of the trumpet. It is only on or near this line that the full effect of the trumpet is perceived, and the person using it therefore holds it in the direction toward which he wishes the sound conveyed. On the assumption that the effect proceeds from successive reflections, the best form of the trumpet would be that of a parabolic conoid, its focus in the mouthpiece. This also being well adapted for collecting sounds from without, and bringing them together in one focal point, is the most suitable form for the ear trumpet. It is not, however, by any means certain that the sound is reflected from side to side of the trumpet; and from the experiments of Hassenfratz it seems that the effect is not diminished either when the vibrations are prevented by a tight wrapping of cloth around the trumpet, or when the reflections are prevented by a lining of woollen. It would appear then, as suggested by Sir John Leslie in his "Experimental Inquiry into the Nature and Propagation of Heat," that the propagation of the sound may be owing to a strong longitudinal vibration of a body of air, forcibly acted upon by the organs of articulation, in the confined space in which it is partially detained until suddenly released from the reflected form of the aperture to spread along the atmosphere.

**SPECIES**, a division among animals, the precise limits of which are differently established by naturalists, and by some regarded as a non-existent or constantly changing relationship. Buffon defines a species as a succession of similar individuals which reproduce each other; Cuvier's definition is nearly the same, the fact of constant succession constituting alone

the unity of the species; both these definitions apply equally well to varieties artificially produced and to acknowledged species, and are therefore incomplete. The advocates of the unity of the human races are compelled, more or less completely, to make fertility of offspring the test of specific identity. Dr. Prichard says the idea of a species includes only the following conditions: "separate origin and distinctness of race, evinced by a constant transmission of some characteristic peculiarity of organization," varieties being such diversities as are observed to take place within the limits of species; some of the latter may become permanent by propagation in a breed, and, unless the fact of their origination be known, impossible to distinguish from original species. Prichard also inclines to the opinion that hybridity is a test of species, though he admits that the numerous exceptions to the sterility of hybrids may well excite doubt as to the soundness of this conclusion. Some of his followers in America have assumed as a fact the sterility of hybrids, and have made it a test of specific difference; on this subject see the authorities quoted under HYBRID. Prof. Agassiz, in his "Essay on Classification" (part i. chap. 2, sec. 6), maintains that sexual union is a result of the close relationship established in the beginning between individuals of the same species, and is not the cause of their identity in successive generations; the first created animals paired because they were made for each other, and not to build up a species, which had full existence as a natural group, and in harmonious numerical proportions, before the first individual produced by sexual connection was born; on this principle the procreation of hybrids from nearly allied species, with all their degrees of fertility, loses its apparent contradiction to general laws. Another difficulty, according to the same author, in the way of making sexual relations determine the limits of species is, that promiscuousness of intercourse does not prevail among men or most of the higher animals; every farmer knows that different breeds of the same species are less inclined to mingle than individuals of the same breed. Facts, accumulating every day, go to show that a species does not imply the idea of community of origin, of a necessary genealogical connection, or of creation in a single locality. Though species are limited in their existence, as palæontology teaches us, their duration, as compared with a single life, may be regarded as boundless, or at any rate beyond computation. Species belong to a certain period of time, and hold definite relations to external conditions and to coexisting animals and plants, as in distribution over the earth, capacity for enduring climatic changes, habitat in regard to land and sea and to physical geography, nature of food, duration of life, mode of association, period of reproduction, changes or metamorphoses during growth, size and proportion of parts, ornamentation, variations in a state of nature or domestication,

&c. With so many elements in the problem, it is manifestly impossible to pronounce upon specific identity or diversity at first sight; many doubtful species have been introduced into zoology and botany from an incomplete idea of what constitutes a species.—Dr. S. G. Morton defines a species as "a primordial organic form," implying a uniformity of anatomical structure and physiological function from the beginning; he makes the following division: 1, remote species in the same genus, between which hybrids are never produced; 2, allied, producing infertile offspring; and 3, proximate, with a fertile offspring *inter se*. Some naturalists are of opinion that there are several species of men; there are many osteological differences, implying variety of function, habit, and powers. De Lamarck and Geoffroy St. Hilaire deny the existence of permanent species in nature, and insist upon the uninterrupted succession of the animal kingdom, and the gradual merging of one species in another from the earliest geological ages; a view which Darwin ("On the Origin of Species by means of Natural Selection," London, 1859) has recently revived. Swainson and others are of opinion that permanent varieties, arising from peculiarities of climate, food, and treatment, constitute species. Darwin maintains the theory of the transmutation of one species into another by descent with modification through natural selection; that species are only strongly marked and more or less permanent varieties, descended from comparatively few original types, continuing in unbroken series through all geological time, though many intermediate forms have become extinct and have left no trace behind, and continually but very slowly changing by the preservation and accumulation of successive slight favorable variations, so that no clear distinction can be drawn between species and well marked varieties. The truth as to the origin of species is probably to be found between the two extremes of their independent creation and descent by natural selection. The two are not inconsistent in reality, though they may be in appearance, as is shown by Prof. Parsons in the "American Journal of Science" for July, 1860; he assumes the middle ground, that there have probably been creative acts for the several species, equally removed from independent creations out of unorganized matter and from origin through natural selection, but taking advantage, in the successive developments, of previously existing and nearest allied animals, and modifying them in the creation of the new species.

**SPECIFIC GRAVITY.** See GRAVITY, SPECIFIC.

**SPECTACLES,** a pair of lenses set in a light frame in such manner as to be conveniently worn in front of the eyes for the purpose of assisting defective vision. The lenses are made of different forms adapted to the several sorts of defects to be corrected. When the pupil of



the eye is flattened, as is common in old age, and the rays of light from any object are not sufficiently refracted, so as to be brought to a focus on the retina, but would be at some distance back of it, the lens required is double convex, and of that degree of convexity suited to the particular case. That there may be the least spherical aberration, and consequently the most perfect image on the retina, the radii of the outer and inner surfaces should be as 6 to 1 in glass, and as 14 to 1 in lenses of quartz. In general the required focal distance of glasses diminishes with the age of the person, as the defect of farsightedness increases; and Dr. Kitchener, in his "Economy of the Eyes," has given the number of inches of focus adapted to the different ages, as 36 inches for 40 years, 24 for 50, 16 for 60, 12 for 70, 9 for 80, 7 for 90, and 6 for 100; but no rule of this kind can be of universal application. The opposite defect of nearsightedness, caused by the rays after entering the eye being too soon refracted by reason of the excessive convexity of the crystalline lens, requires a double concave lens, which shall spread the rays further apart before they reach the eye, and thus throw their point of meeting further back upon the retina. —The use of spectacles is not merely for convenience in bringing objects in the usual range and distinctness of the healthy eye; but they serve, when properly selected and used, as a protection against rapid deterioration of its powers. The tendency to increasing farsightedness and corresponding indistinctness of vision with increasing age is checked by the use of convex glasses of as low power as will suit the eye; but if, on the contrary, those are worn of a higher power than is necessary, the eye is strained, and the natural defect increased by its being compelled to accustom itself to lenses adapted to a flatter eye. The same principle applies in the use of concave lenses, those of comparatively low power tending to check the increase of the defect, and those of higher power than necessary hastening it. It is also important to commence the use of spectacles immediately when it is perceived that they afford better vision and relief to the eye; and they should be changed for others of greater power, whenever found insufficient. Glass of the lowest dispersive power should be selected for the lenses, and uncolored, unless it be desirable to protect the eye from excessive light, when it may be of a bluish gray, or still better of a greenish shade or opaque. Defects such as inaccuracy of figure, blebs, and scratches are to be particularly avoided. The first may be detected if letters upon a printed page appear distorted when seen through the glasses placed near to them and then gradually moved back toward the eye. The other defects are exposed on passing the glasses between the eye and the flame of a candle. Rock or quartz crystal is sometimes used instead of glass. It is not so liable to receive scratches, being harder than glass; but it is a question whether, the rays of

light being irregularly refracted, the eye is not injured by lenses of this material. Sir David Brewster, however, strongly recommends the use of the variety known as the Brazilian quartz pebble, which has a lower dispersive power than any kind of glass. In selecting spectacles he advises that particular attention be given to the special service they are designed for, whether for near use as in reading, writing, &c., or for more distant employment; and that this known distance, whatever it may be, should be applied to determine the required distance apart of the centres of the two glasses. This is done by first ascertaining how far from the eye the lens will be placed when it rests in its proper position in its frame on the nose, and then the distance between the centres of the pupils when they are directed to a point at the distance at which we wish to use them. Lines thus drawn from each pupil to the point determined should pass through the centres of the glasses and thus fix their distance apart, which it is obvious will be less than that of the pupils themselves. Spectacles should thus be worn only for the particular use they are selected for; and if the eyes require aid to view objects at other distances, other spectacles should be provided adapted to these distances. The focal length of the lenses should also vary with the distances of observation, as for reading, viewing galleries of pictures, or still more distant objects. Single lenses, as in the common eye glass, are very objectionable. One eye is liable to be exercised more than the other, and a difference is likely to be occasioned in their power and focal length. It is not unusual to find such a difference in the two eyes, and in this case the lenses should be correspondingly different from each other. An instrument called a visometer has been recently introduced for determining the relative powers of the two eyes, for the purpose of providing them with the suitable lenses. Spectacles have also been made with lenses differently set in order to correct obliquity of vision, as squinting. Spectacles called periscopic were contrived by Dr. Wollaston, with a view of giving more scope to the vision without so much turning of the head as is necessary with the use of ordinary spectacles. For this purpose the lenses are made concave on the side turned to the eye, and for farsightedness their shape is that of a meniscus or crescent; for nearsightedness they are thicker toward the edges and thinnest in the centre, and the curve of least radius is that of the surface next the eye, while in the other case it is of the outer surface. The advantage gained is probably at the expense of some distinctness, as the eye does not look through the centre of the lenses. To afford the greatest protection to weak eyes against the accession of bright light, side lenses or wings of colored glass are sometimes added, or instead of glasses pieces of light fabric are introduced with the view of excluding light and dust. The mounting of spectacles has been

carried to great perfection in the construction of the most delicate frames of steel; some of which like hair lines, at the great exhibition of 1851, weighed only 11 grains, and the whole weight including glasses did not exceed 2 dwts. — When and by whom spectacles were invented is not known. Roger Bacon, who died in 1292, speaks in his *Opus Majus* of the benefit to old men and those with weak eyes derived from the use of a plano-convex glass, or large segment of a sphere, by its magnifying the small letters. Several Italian writers of the early part of the 14th century distinctly allude to the invention as being then recent; and Muschenbroek states that it is inscribed on the tomb of Salvinus Armatus, a Florentine nobleman who died in 1317, that he was the inventor of spectacles.

**SPECULUM** (Lat. *speculum*, a mirror), a term commonly applied to concave metallic reflectors, such as are used in reflecting telescopes for concentrating the rays of light from distant luminous bodies, and presenting the image of these in their focus. Their perfection consists in large surface, whereby they collect the greatest quantity of light; in the highest possible polish, whereby it is reflected with least loss; and in the most exact parabolic curvature, rendering the image distinct and precise. In a speculum of 6 feet diameter, a variation even at its edge from the true parabolic curvature, so minute as to escape detection with any except the most refined means of measurement, may render the whole useless. To attain perfection in the face of such difficulties has called forth the careful study and persevering labors of the most eminent astronomers and mechanicians. The metallic alloy best adapted for the requirements of specula was first employed for this purpose by Sir Isaac Newton, and is similar to that used by the ancient Egyptians for mirrors. It consists of copper and tin, to which Newton added a little arsenic, and sometimes silver; but Lord Rosse finds that the two metals first named are better without the addition of any other, and he is particular that they should be combined in their atomic proportions (4 atoms of copper = 126.8, to 1 of tin = 59), and the purest metals should be selected; for the smaller specula it is even recommended that the copper be obtained by the electrotype process. This is hardly practicable for the large ones. The alloy is remarkable for its extreme brittleness and hardness. Large masses of it sometimes break from a slight blow or sudden change of temperature; and it is so hard that it cannot be wrought with tools of steel. It takes a most brilliant polish, which it has been known to retain with little tarnish, though exposed to the air for more than 16 years. A large speculum, however, ought always to be covered when not in use, and the air about it should be kept dry by means of an open box of quicklime. Great difficulties have been encountered in preventing the large specula from changing their form by their own weight; and

those of 6 feet diameter are made so thick, to give them the necessary stiffness (though supported when finished by the most ingenious appliances), that they are among the heaviest of bronze castings; and from the numerous precautions they exact, the preparation of the rough mass is among the most difficult of foundry operations. A 6-foot speculum weighs 4 tons; one of 8 feet,  $3\frac{1}{2}$  inches thick, weighs 13 cwt.; and one of 2 feet,  $3\frac{1}{4}$  cwt. The alloy is prepared by melting the metals separately, and pouring the tin into the copper, stirring rapidly, and then, before the tin oxidizes, casting the alloy into ingots. It is tested when cold to ascertain its brilliancy, and more tin is added if necessary. Before the best method of making the great castings was determined upon, the several processes connected with the operation were the subjects of numerous experiments. It was even found that the large cast iron crucibles, as usually cast with the mouths down, were unsuitable for remelting the alloy on account of their porosity, and this defect was remedied by casting others with the mouths up. One was prepared by Lord Rosse that held 15 cwt.; but two of half this capacity are found more convenient to use. They are swung on cranes, so as to be quickly lifted from the furnaces, and transfer the melted alloy directly into the moulds. The best mode of preparing the latter has been arrived at from long experimental trials in the casting of the smaller specula. It was found that sand moulding would not answer for the surface of the disks, as the texture of the alloy near the outside was rendered somewhat spongy and crystalline; and though this was so slight as to be detected only by the microscope, it still seriously impaired the polished surface. The face of the disk at least must then be "chilled," as cast iron is chilled, by pouring it into metallic moulds to increase the density of its surface. But the ordinary temperature of the atmosphere was found to be too low for the moulds to receive this alloy, and they were consequently heated to about  $212^{\circ}$  to prevent too sudden cooling and consequent irregular contraction. For moderate-sized specula cast iron moulds were used, necessarily open, or the casting would inevitably fly in pieces. They were made a little deeper than the speculum, with the bottom of the same convexity with this, and so supported that they could be instantly filled from the lowest point, and turned into a horizontal position when charged with the proper weight of the metal. The air and any foreign substance present are thus carried up to the surface, and separated from the alloy. This, however, was not sufficiently perfect for the largest castings, and Lord Rosse was led to adopt for these the following method. An iron frame of sufficient diameter was filled with pieces of hoop iron set on edge and tightly wedged together, and the upper surface was turned off to the curvature of the face of the speculum. This was to serve for the bottom

of the mould, being tight enough to hold the melted metal, while it allowed the escape of the gases through the interstices uniformly over the whole face. Upon this bottom was laid the wooden pattern, made twice as deep as the intended speculum, and with an allowance of  $\frac{1}{8}$  in the diameter for shrinkage. The sides of the mould were then formed by ramming sand around the pattern. By this arrangement the first cooling is on the under face, next on the sides, and the final congealing is on the top or back, where the contraction and resulting irregularities will be concentrated in the least important part. The casting being made, the next operation is the annealing, which also exacts extraordinary care. The metal while red-hot is removed to a furnace specially prepared for it, the bottom having the curvature of the disk (unless in case of using an iron mould, when this too is taken along). By fires already kept up several days, the inner walls of the furnace should be at a full red heat. The vacant spaces around the casting are then filled with ignited fuel, and every aperture is carefully luted. A large speculum should thus be left to cool for a month to 6 weeks; and the result may still be unsatisfactory if the walls of the furnace are less than two feet thick.—The production of the true parabolic figure, combined with a brilliant polish, is spoken of by Prof. Nichol as one of the most wonderful achievements of art. It is attained by grinding, succeeded by polishing, and in all the details of the operations the utmost care is necessary to secure that precise accuracy of figure on which the whole success depends. Machines applicable to this object have been invented by Sir W. Herschel and his son, Lord Rosse, Mr. Lassell, an amateur optician and astronomer, Mr. De la Rue, Mr. Grubb of Dublin, and others, which are of too complicated construction to be particularly described in this place. The object sought for is to restrict the operation of the rubbing tools to the production of the particular curvature required, and insure a uniform action upon every part of the surface of the disk. The speculum, placed upon a slowly revolving platform, presents its face to the action of the rubber above it, which by Lord Rosse's arrangement was caused to vibrate regularly in one and the other direction, while at the same time it revolved at a different rate from that of the speculum. Mr. Lassell caused the rubber to revolve in small circles, while the speculum, turning on its axis, which was not in line with that of the rubber, presented successively all portions of its surface to this circling action of the rubber, thus imitating the movements of the hands by which the small specula had previously been successfully polished. The principles of the arrangement of Mr. Lassell were so mathematically exact, that, as stated by Mr. Nasmyth, "a speculum having a decidedly hyperbolic figure may be corrected and brought to a perfect parabola, or to a spherical curve, or the same

may be done in the reverse order at pleasure." The accuracy of the polishing, and the limit to which the consequent reduction may be carried, is subjected to an optical test during the operation, as no mechanical one can well be applied of sufficient delicacy, and the former moreover is to be the constant test of the work in its practical uses. The test consists in observing through an eye piece the reflection of the dial of a watch set directly over the speculum, and as in the case of Lord Rosse's operations at the height of 90 feet. The success of the polishing was dependent on the state of the atmosphere as regards temperature and moisture, both of which required at times to be artificially regulated. The tools for first smoothing the face of the speculum are made up of pieces of grit-stone, cemented together in a frame and dressed on the face to the proper degree of convexity. The next are disks of cast iron, their face also of the exact curvature, and grooved by two lines of furrows  $\frac{1}{4}$  inch wide, and the same deep, crossing each other at right angles. These are fed with sharp quartz sand, and afterward with emery and water. When the work has proceeded to the use of very fine emery the scratches disappear, and the rubber is in perfect and uniform contact with the speculum. For polishing, the cast iron rubber was used by Lord Rosse, counterpoised and provided with circular grooves in addition to the rectilinear ones. Its face was coated with a thin layer of pitch, with another upon this of rosin and flour, which serves as the bed for the polishing powder or rouge to imbed itself. Mr. Lassell's polisher was of pine wood in two layers, the grain crossing, and the face coated with pitch above. The preparation of these polishers involves a number of nice operations, which may not be neglected without great risk of failure. The largest specula when polished ought never to be removed from their supports; for however carefully lifted, the figure would be almost certain to lose its accuracy by change of pressure in the mass. Even one of 9 inches diameter, when supported by the pressure of springs against 8 stops bearing on its edges, loses its defining power. Sir John Herschel laid the speculum upon folds of woollen cloth, packing others closely all around it, filling the space between its edges and the box that contained it; but this is not sufficient to preserve the form of the large specula of 6 feet diameter and as many inches thick, and the contrivances for this are a most complicated system of bearings, springs, and levers.—Specula exhibit some peculiarities in their forms and applications to use, according to the kind of reflecting telescope for which they are designed. It is evident that as they reflect images as mirrors, the observer cannot be placed directly in front, and it is not obvious how he can take his position at the opposite end of the telescope, as in using those of the refractory kind. This, however, is accomplished in the reflecting telescope of Dr. James Gregory,

known as the Gregorian telescope, by an aperture through the centre of the speculum, and the introduction of a small concave speculum in the centre of the great tube, facing the large speculum, and a little in advance of its focus. Back of the great speculum the tube is extended of reduced diameter, and in its extremity is a magnifying eye piece, by which the image reflected from the small speculum through the aperture of the large one reaches the eye. In Sir William Herschel's great telescope, with its 4-foot speculum and 40-foot focal length, the disk was entire, and the image was reflected direct to an eye piece at the mouth of the tube and near one side of it, so as not to intercept too much light. This was effected by a slight inclination of the plane of the speculum. In Sir Isaac Newton's telescope the disk was also entire, and a small plain speculum reflected the cone of rays sent from it, before meeting in the focus, to the eye piece placed in the upper side of the tube. Cassegrain's telescope differs from Gregory's in the small reflector being convex instead of concave. Specula have recently been made of polished silver surface, which has the advantage over that of the speculum metal of reflecting 91 per cent. of the incident light, instead of 67 per cent. The silver, after the method of M. Léon Foucault, is laid in a very thin uniform coating upon a speculum of glass, figured and polished to a true parabola. This is done by Drayton's process of precipitating the metal from the solution in nitric acid by oil of cassia. The precipitated silver is polished by gentle rubbing with a skin lightly tinged with oxide of iron, and soon acquires a very brilliant lustre without material change of figure. This, however, was questioned by Mr. Grubb, when the subject was under consideration before the British association at Dublin, who asserted from his own experience that the removal of a thickness of  $\frac{1}{100,000}$  or  $\frac{1}{25,000}$  of an inch might seriously impair the accuracy of the defining power of the speculum. M. Foucault had preserved the silver mirrors for 8 months without their being injured by tarnishing; but whenever this might occur they were easily polished again, and the silver itself could be at any time renewed.—The subject of the speculum, in its mathematical and mechanical details, is treated in various memoirs in the scientific English journals, from the time of Newton's paper in the "Philosophical Transactions" of 1672 to the present day. Lord Rosse's papers are contained in the "Edinburgh Journal," vol. ix., 1828, and vol. ii. (new series), 1829, and in the "Philosophical Transactions," 1840 and 1850. The mechanical details are fully described in Holtzapffel's "Mechanical Manipulations." For Lassell's process, see "Transactions of the Royal Astronomical Society," 1849.

SPELMAN, SIR HENRY, an English antiquary, born at Congham, near Lynn, Norfolkshire, in 1562, died in London in 1641. He was educated at Trinity college, Cambridge, and at the age of 18 commenced the study of law,

served as sheriff of his county, and was appointed by James I. commissioner to determine disputed claims to lands and manors in Ireland. In 1612 he withdrew from public employment and settled in London to pursue his antiquarian researches. He wrote a treatise *De non Temerandis Ecclesiis*, in defence of church property, which involved him in some controversy. His other works are: *Glossarium Archaeologicum* (1626), which he carried only to the letter I, and which was completed from his MSS. after his death; *Concilia, Decreta, Leges, Constitutiones, in Re Ecclesiastica Orbis Britannici*, also left incomplete (2 vols., 1639-'64); and *Villare Anglicanum* (1656). The work entitled *Reliquia Spelmaniana* (fol., Oxford, 1698) is a collection of his papers relating to the laws and antiquities of England. He left a manuscript entitled *Archæismus Graphicus*, on the contractions in old writings.

SPENCE, JOSEPH, an English author, born at Kingsclere, Hampshire, April 25, 1699, drowned at Byfleet, Surrey, Aug. 20, 1768. He was educated at Oxford, entered holy orders, and was elected professor of poetry at Oxford. He had published in 1726 a small critical volume, entitled "An Essay on Pope's Odyssey." He made a tour through France and Italy in 1730-'33, in company with Charles, earl of Middlesex, afterward duke of Dorset. He published in 1731 a biography of Stephen Duck, afterward prefixed to an edition of Duck's poems, and in 1736 reproduced with a preface at Pope's request Sackville's tragedy of "Gorboduc." In 1742 he was appointed to the professorship of modern history at Oxford. In 1747 appeared his "Polymetia," in which he attempted, by comparing the works of the Roman poets and the remains of the ancient artists, to illustrate them mutually. He is said to have cleared £1,500 from the sale of this work, which is one of those discussed by Lessing in his *Laokoon*. He also edited Blacklock's poems, and wrote tracts on various subjects which are contained in Dodsley's "Fugitive Pieces." His most interesting production is entitled "Anecdotes, Observations, and Characters of Books and Men," collected from the conversation of Pope and others, and valuable with reference to the literary history of his time. After remaining in manuscript more than half a century, it was published, with notes and a biography, by S. W. Singer (London, 1820; new ed., 1858).

SPENCE, WILLIAM, an English entomologist, born in 1783, died in London, Jan. 6, 1860. In 1805, while engaged in business at Hull, he presented a few specimens of insects to the Rev. William Kirby, and thus laid the foundation of a life-long friendship with him. He proposed in 1808 that they should write in partnership a work on entomology; and the result was their "Introduction to Entomology, or Elements of the Natural History of Insects" (4 vols., 1815-'26; 7th ed., 1 vol., 1858). It consists of 51 letters, of which 9 were written by Mr.

Spence, 20 by Mr. Kirby, and 22 by the authors conjointly. He removed in 1826 to the continent, and visited the principal European capitals during the next 8 years, returned to England and settled in London. He was a fellow of the royal, Linnaean, and entomological societies.

SPENCER. I. A N. co. of Kentucky, intersected by Salt river; area, 280 sq. m.; pop. in 1860, 6,188, of whom 2,205 were slaves. The surface is hilly and the soil fertile. The productions in 1850 were 775,878 bushels of Indian corn, 55,614 of wheat, 109,215 of oats, 15,660 lbs. of tobacco, and 22,326 of wool. There were 10 churches, and 544 pupils attending schools. Capital, Taylorsville. II. A S. W. co. of Indiana, bordering on the Ohio river, bounded E. by Anderson's creek, and W. by Little Pigeon creek; area, 390 sq. m.; pop. in 1860, 14,556. The surface is hilly in the W. part and level in the S., and the soil fertile. The productions in 1850 were 598,135 bushels of Indian corn, 19,777 of wheat, 39,216 of oats, and 1,697 tons of hay. There were 14 churches, and 1,260 pupils attending schools. Bituminous coal is abundant. Capital, Rockport.

SPENCER, AMBROSE, LL.D., an American jurist, born at Salisbury, Conn., Dec. 13, 1765, died at Lyons, N. Y., March 13, 1848. He was educated at Yale and Harvard colleges, and was graduated at the latter in 1783. Having studied law, he commenced practice in Hudson, N. Y., where he was elected city clerk in 1786. In 1793 he represented Columbia co. in the state legislature; in 1795 and for 7 consecutive years he was state senator; in 1802 he was appointed attorney-general; in 1804 made a justice of the supreme court, and in 1819 promoted to be chief justice, which office he resigned in 1823, and resumed the practice of his profession at Albany. He was for some years mayor of that city, and also represented the Albany district in congress. In 1839 he retired to the village of Lyons, and engaged in agricultural pursuits. In 1844 he presided over the national whig convention at Baltimore. His energy, resolution, and high legal attainments, devoted as they were for the greater part of his life to public affairs, have left a permanent impress on the constitution and institutions of New York.—JOHN CANNFIELD, LL.D., son of the preceding, an American jurist and statesman, born in Hudson, N. Y., Jan. 8, 1788, died in Albany, May 18, 1855. He was graduated at Union college in 1806, and in 1807 became private secretary of Gov. Tompkins. He was admitted to the bar in Canandaigua in 1809, in 1811 was made master in chancery, in 1814 postmaster of Canandaigua, and in 1815 district attorney for the western district. In 1817 he was elected a member of congress, where he was one of the committee to examine into the affairs of the United States bank, and drew up the committee's report. In 1819-'20 he was a member of the state assembly, and in the latter year its

speaker; and he was subsequently reelected to the assembly at 3 different times. In 1824 he was elected to the state senate, and in 1827 appointed by Gov. Clinton one of the revisers of the statutes of the state, upon which he published a series of essays explaining their purposes. In 1839 he was appointed secretary of the state of New York. President Tyler in 1841 appointed him secretary of war, and in 1843 transferred him to the treasury department. He resigned in 1844, in consequence of his opposition to the annexation of Texas, and afterward devoted himself to the practice of his profession. He was repeatedly appointed a commissioner on important questions by the state legislature, and his thorough and extensive legal attainments caused his advice to be sought on most constitutional questions. The organization of the state asylum for idiots and the improvement of the common school system of the state were to a very considerable extent accomplished by his efforts. He edited the first American edition of De Tocqueville's "Democracy in America," with an original preface and notes (New York, 1838).

SPENCER, HERBERT, an English author, born in Derby in 1820. He was educated by his father, a teacher in Derby, and his uncle, the Rev. Thomas Spencer, a clergyman of the established church, who at one period travelled and lectured in the United States. At the age of 17 he became a civil engineer, but after about 8 years abandoned the profession, having during this period contributed various papers to the "Civil Engineer's and Architect's Journal." His first productions in general literature were in the shape of a series of letters on the "Proper Sphere of Government," published in the "Nonconformist" newspaper in 1842, some of which were reprinted in pamphlet form. From 1848 to 1852 he was engaged as a writer for the "Economist," and during this time published his first considerable work, "Social Statics," an analysis of the principles of sociology or the fundamental laws of the social structure. In 1855 appeared his "Principles of Psychology," an attempt to analyze the relations between the order of the worlds of matter and mind. Its fundamental idea has been stated as follows: "The universal law of intelligence flows directly from the coöperation of mind and nature in the genesis of our ideas. It is this: that just in proportion as there is a persistency in the order or relationship of events in nature, so will there be a persistency in the connection which subsists between the corresponding states of consciousness. The succession or coexistence of external phenomena produces, of course, a like succession or coexistence in our mental perceptions; and when any two psychological states often occur together, there is at length established an internal tendency for these states always to recur in the same order. Starting therefore from this law, the author first traces the growth of the human intelligence through

the lower phenomena of reflex action and instinct; then shows how our unconscious life merges in a succession of conscious phenomena; and, lastly, carries us upward through the regions of memory, &c., to the highest exercise of reason and the normal development of the feelings." Mr. Spencer has contributed extensively to the English periodicals, and republished a volume of these articles under the title of "Essays, Scientific, Political, and Speculative," among which are papers on the "Genesis of Science," the "Origin and Functions of Music," the "Philosophy of Style," "Transcendental Physiology," "Over Legislation," "Progress, its Law and Cause," &c. Other articles since have attracted marked attention, as "Recent Astronomy and the Nebular Hypothesis," "The Laws of Organic Form," "Theory of Population," "The Social Organism," &c. A series of review articles on "Education, Intellectual, Moral, and Physical," was republished collectively in 1860. Mr. Spencer is at present (1862) engaged upon a series of philosophical works designed to unfold in their natural scientific order the principles of "Biology," "Psychology," "Sociology," and "Morality," to be published in quarterly parts.

SPENCER, JESSE AMES, D.D., an American clergyman and author, born at Hyde Park, Dutchess co., N. Y., June 17, 1816. He was graduated at Columbia college in 1837, and having studied theology in the general seminary of the Episcopal church, he was ordained deacon in July, 1840, and priest the next year. After 2 years' labor in the ministry at Goshen, N. Y., he was compelled by ill health to make a trip to Europe, and on his return home he engaged in educational pursuits and various literary occupations. In 1848-'9 he travelled in Europe, Egypt, and the Holy Land, and in 1850 was appointed professor of Latin and oriental languages in Burlington college, N. J. He became editor and secretary of the Episcopal Sunday school union and church book society in 1851, but resigned that position in 1857. He received the degree of D.D. from Columbia college in 1852, and was elected vice-president of the Troy university in 1858, but declined. He has published a volume of "Discourses" (1843); "History of the English Reformation" (1846); "The New Testament in Greek, with Notes on the Historical Books" (1847); "Caesar's Commentaries," with copious notes, lexicon, &c. (1848); "Egypt and the Holy Land" (1849), a book of travels; and a "History of the United States" (3 vols. 8vo., illustrated, 1858).

SPENCER, JOHN CHARLES, 3d earl, an English statesman and agricultural reformer, born May 30, 1782, died at Wiseton hall, Nottinghamshire, Oct. 1, 1845. He was educated at Harrow school and at Trinity college, Cambridge, and in 1804 entered the house of commons as member for Oakhampton, being then, and indeed during his whole political career, known by his courtesy title of Viscount Al-

thorp. During the whig administration of 1806-'7 he held the appointment of junior lord of the treasury, and in the long interval of tory ascendancy which succeeded he was a leader of the opposition in the lower house, where for upward of 25 years he represented the county of Northampton. Upon the return of the whigs to power in 1830, Lord Althorp was appointed chancellor of the exchequer, and became ministerial leader in the house of commons, through which he was instrumental in carrying the reform bill and the poor law amendment bill. He resigned with his colleagues in Nov. 1834, and did not afterward take a prominent part in public affairs. About the same time he succeeded his father as Earl Spencer, and being relieved from official occupations he devoted himself with zeal to practical farming and the rearing of cattle, and by his efforts gave a considerable stimulus to agricultural reform. The royal agricultural society, founded at his suggestion and of which he was the first president, was one of the most important agents in effecting this result. He was also one of the founders of the Roxburghe club, and vice-chairman of the society for the diffusion of useful knowledge.

SPENCER, WILLIAM ROBERT, an English poet, born in 1769, died in Paris in 1834. He was a grandson of Charles, 2d duke of Marlborough, and for many years held a prominent position in metropolitan circles as a wit and a man of fashion. In 1796 he published a translation of Bürger's *Leonore*, and his poems subsequently produced comprise principally ballads and occasional pieces known as *vers de société*, some of the latter of which are among the most polished and elegant of their class. Pecuniary difficulties obliged him to spend the latter portion of his life in Paris. His poems were collected and published in 1835, with a memoir of the author.

SPENER, PHILIPP JAKOB, a German clergyman, and founder of the sect of the pietists in Germany, born at Rappoltswiler, now Riebauville, in Alsace, Jan. 13, 1635, died in Berlin, Feb. 5, 1705. He studied theology at Strasbourg, and at the age of 19 became the tutor of the sons of the prince of Birkenfeld. In 1659 he commenced a tour of the universities, according to the custom of the time, visiting in succession Basel, Tübingen, Freiburg, Geneva, and Lyons, acquiring some new science or language in each, and spending 3 years in the tour. In Lyons he devoted considerable attention to heraldry, and commenced some historico-genealogical works, which he published at intervals during the next 25 years. Returning to Strasbourg in 1662, he was appointed public preacher to the city, and was soon after invited to Frankfort-on-the-Main in a similar capacity. In 1670 he established a weekly meeting of his hearers, which he called *collegia pietatis*, at which he explained any difficulties that they had found in his sermons. From this meeting, and those which grew out

of it, sprang, without any design on Spenser's part, the sect of the pietists, so called at first in derision by the professors and people of Leipsic, but eventually the name was accepted by themselves. In 1686 he removed to Dresden, where he was appointed court preacher, and made a member of the consistory. His views were violently opposed by the Saxon clergy, especially after the foundation of the new university at Halle, the professorships in which were filled by his disciples, and which became at once the central point of the pietistic doctrines. The old Lutherans brought against him 264 charges of heterodoxy. He defended himself with ability and success; but in 1691 he gladly accepted an invitation from the elector Frederic of Brandenburg to take up his residence at Berlin, where he was appointed provost, inspector of the church of St. Nicolai, and assessor of the consistory. His later years were devoted to the preparation of theological works.

SPENSER, EDMUND, an English poet, born in East Smithfield, London, probably in 1558, died in King street, Westminster, Jan. 16, 1599. In one of his poems he alludes to his connection with "an house of ancient fame," and it is maintained by Mr. Craik that he belonged to the Spencers of Hurstwood, Lancashire; but the rank of his parents and the degree of his affinity to a noble family are unknown. He was entered a sizar of Pembroke hall, Cambridge, in 1569, and took the degree of bachelor in 1572 and of master in 1576. He there formed a lifelong intimacy with Gilbert Harvey, the poet and astrologer; and from one of his letters it appears that Spenser left the university in consequence of having offended certain influential persons and in despair of academical preferment. He was received by some friends in the north of England, perhaps at Hurstwood, where he wrote his "Shepheardes Calendar," and fell in love with a lady who preferred a rival, and whom he is supposed to have had in mind in depicting his "Rosalind." Induced by Harvey to repair to London, he was introduced to Sir Philip Sidney, "one of the very diamonds of her majesty's court," who invited him to become his guest, and in return for whose hospitality his "Shepheardes Calendar," on its publication in 1579, was "entitled to the noble and virtuous gentleman, most worthy of all titles, Maister Philip Sidney." It consists of 12 eclogues, one for each month, and, unlike the other pastoral writings of that age, gives instead of transferring to them the polished language of courtiers. "This poem," says Hallam, "has spirit and beauty in many passages, but is not much read in the present day, nor does it seem to be approved by modern critics." It appeared anonymously, and was for a time generally ascribed to Sidney himself. For the next 10 years little is known concerning Spenser. He corresponded with Harvey on the innovation of banishing rhymes and introducing the Latin prosody into English verse,

forgetting, says Nash, that "the hexameter, though a gentleman of an ancient house, was not likely to thrive in this clime of ours, the soil being too craggy for him to set his plough in." Recommended by Sidney to his uncle, the powerful earl of Leicester, he is supposed to have experienced many reverses as a suitor for court favors, and to have subsisted by casual gratuities. He was occasionally employed on inferior state missions, went to the continent probably in 1579-'80, and soon after was sent to Ireland as secretary to Lord Grey of Wilton, who was appointed lord deputy of that country. The "Foure Epistles," on satiric poetry and on an earthquake in London, which passed between Spenser and Harvey, and which induced a controversy between the latter and Nash, were published in 1580. He returned from Ireland after two years, and in 1586 obtained a grant of 8,028 acres of the forfeited lands of the earl of Desmond, in the county of Cork, from which Sir Walter Raleigh had previously received 12,000 acres for military services. The condition of the grant was that he should reside on his estate, and he therefore took up his abode in Kilcolman castle, near Doneraile, where he composed most of the "Faerie Queen," upon which he had been engaged several years. After the death of Sidney at the battle of Zutphen, he wrote the pastoral elegy of "Astrophel" (published in 1595) to his memory, and from this time Raleigh became his principal patron and friend. He was visited in 1589 by Raleigh, whom he styles "the shepherd of the ocean," and who persuaded him to return to London to arrange for the publication of his poem. The first three books appeared in 1590, dedicated to Queen Elizabeth, and with a letter to Raleigh explaining the work as "a continued allegory or dark conceit." He was presented to the queen, from whom he received a pension of £50, returned to Ireland, and published "Colin Clouts come Home again" (1591); a collection of minor poems entitled "Complaints" (1591); a series of "Amoretti" and the "Epithalamium" (1595), relating to his courtship and marriage; four "Hymns" (1596), the two on love and duty, pervaded by a Platonic doctrine, being among his most exquisite productions; and the 4th, 5th, and 6th books of the "Faerie Queen" (1596). He was married in 1594, but it is not certain whether the lady was the "Elizabeth" of his sonnets, nor whether it was a first or second marriage. In 1596 he presented to the queen his "View of the State of Ireland," a treatise in the form of a dialogue, which was not published till 1683. He was a conspicuous object for the enmity of the Irish on the outbreak of Tyrone's rebellion, since he was clerk of the council of Munster, had been recommended by the queen to be sheriff of Cork, was an urgent advocate of arbitrary power, and appears to have sought unjustly to add to his possessions. When, therefore, the insurgents rose in Munster in 1598, they attacked



Kilcolman, and the poet fled with his wife. The castle was plundered and burned, and an infant child, which for some reason had been left behind, perished in the flames. Spenser died at an inn a few months after his arrival in London, and, according to Ben Jonson as reported by Drummond of Hawthornden, for want of bread; but there are circumstances which make this account improbable. The expenses of his funeral were defrayed by the earl of Essex; he was buried at his own request near the remains of Chaucer, in Westminster abbey, and Camden relates that his brother poets attended the hearse, and threw "mournful elegies" into the grave; and a monument erected to him after 30 years by Anne, countess of Dorset, was restored in 1778 by the fellows of Pembroke hall.—His chief poem, the "Faerie Queen," is unfinished, and it has been maintained, upon insufficient authority, that the concluding 6 books were either destroyed by the burning of Kilcolman or lost in their passage from Ireland. The Spenserian stanza, in which it is written, is a modification of the Italian *ottava rima*, with the addition of the Alexandrine line, and the diction was purposely studded with forms and phrases which had become antiquated. Yet Spenser is scarcely surpassed as a master of musical language. The leading story is an allegory, founded on the traditional history of Prince Arthur, who was taken as the ideal of a noble person. Gloriana, the queen of Faerie, who gave name to the poem, is an emblem of virtuous renown. All the personages are symbolical and all the incidents significant of moral truths. The subject of each book is a moral attribute, as holiness, temperance, chastity, friendship, justice, and courtesy, personified by a knight errant, with all human passions. Had the poem been completed, all of these knights, after their achievements, would probably have been led under the auspices of Arthur to the court of the faerie queen, and thus a unity of design been developed. The last great poem of chivalry, it was received with enthusiasm in the adventurous age of Elizabeth. "No poet," it has been said, "has ever had a more exquisite sense of the beautiful than Spenser." "His poetry is the most poetical of all poetry." The land which he describes is an ideal realm of marvels; amid the solitary forests, enchanted castles, fairy gardens, and gorgeous pageants of chivalrous romance, he introduces denizens symbolical of the pure and noble virtues; but his abstract conceptions are made scenes of enchantment by his serious, luxuriant, and melodious delineation. "His descriptions," says Coleridge, "are not in the true sense of the word picturesque, but are composed of a wondrous series of images as in our dreams." The first canto is much the finest; the allegory in it is so skilfully disguised that it may be disregarded; and it fully exhibits the freshness and power of his genius. In the judgment of Hallam, Spenser is still the third name in the poet-

ical literature of England, and has been surpassed only by Dante in any other literature.—His poems, edited with a critical introduction by G. S. Hillard, were published in Boston in 1839 (5 vols.). They also form 5 volumes (1855) in the Boston collection of "British Poets." The most complete edition however is the variorum one of the Rev. I. H. Todd (London, 8 vols. 8vo., 1806). A new edition, with glossary, notes, and life, by J. P. Collier, is announced (Jan. 1862).

#### SPERM WHALE. See WHALE.

SPERMACETI (Gr. *σπερμα*, sperm, and *κητος*, a whale), a solid crystalline fat, extracted from the oily fluids found in a triangular-shaped cavity by the right side of the nose and in the upper part of the head of the sperm whale or blunt-headed cachelot, and also in smaller quantities in some other species of the cetacea. The liquid contents boiled out from the head of the sperm whale of ordinary size sometimes amount to more than 12 large barrels full. When cold they congregate into a spongy mass, from which the larger portion of the oil drains away, leaving the crude spermaceti. This filtration is made more effective by compression in bags in a hydraulic press; and the subsequent purification is effected by melting the residue in water and skimming off the impurities, and remelting in a weak potash lye, which removes nearly all traces of the oil. The spermaceti is then melted alone by steam heat, and ladled into pans, where it cools in white, semi-transparent, lamellar cakes. The last traces of oil may be removed by boiling once or more with alcohol, which dissolves the spermaceti, but when cold holds only the oil. Pure spermaceti, called cetine, has a foliaceous texture and a delicate whiteness. It is semi-transparent, friable, unctuous to the touch, and resembles white wax in lustre and hardness. It is without taste and of hardly any odor; of specific gravity .940; melts at 120°; dissolves readily in hot ether, and in the fatty and volatile oils, separating however on cooling. At high temperatures it sublimes without decomposition if protected from the air. By the addition of a few drops of alcohol or of almond oil it may be powdered. Its ready inflammability in connection with its fusibility renders it well adapted for candles, which is the chief use made of it. (See CANDLES.) It has been employed in medicine, combined with sirup or mucilage, to protect the throat in coughs and colds; and triturated with sugar candy with the addition of milk, it forms a simple nutritive mixture. In pharmacy its use is of greater importance as an ingredient in ointments and cerates. It is not readily saponified, and in this change it differs from the other fats in not yielding glycerine, but another base instead, termed ethal, a white, solid substance, fusible at 118°, and possessing the properties of a true alcohol. It is also called cetyllic or ethallic alcohol, and is represented by the formula  $C_{22}H_{44}O_2$ . The acid into which

also the spermaceti is resolved, is known as the cetyllic, ethalio, or palmitic acid, and is represented by the formula  $C_{22}H_{44}O_4$ .

**SPERMOPHILE.** See **PRAIRIE SQUIRREL**.

**SPEUSIPPUS**, a Greek philosopher, born in Athens about 380 B. C., died in 339. He was a nephew of Plato, and at his death succeeded him as president of the academy, over which he presided 8 years (347-339). He followed partially the philosophic system of his master, but diverged from it in the prominence he gave to empiricism. He endeavored to carry out more fully Plato's threefold division of philosophy into dialectics, ethics, and physics.

**SPEYER.** See **SPIRE**.

**SPEZIA**, a walled town of N. Italy, in the government of Genoa, capital of the province of Levante, situated on the N. W. side of the bay of the same name, 50 m. E. S. E. from Genoa; pop. 9,796. The streets are regularly laid out, and there is a large and handsome square. The town carries on an active trade. The bay is 7 m. long and from 2 to 6 m. wide, and contains the lazaretto of Genoa; and in 1857 the Sardinian naval depot was transferred from Genoa hither.

**SPEZZIA** (anc. *Tiparenoe*), an island of Greece, in the archipelago, at the E. entrance of the gulf of Nauplia, and about 8 m. from the coast of Argolis; greatest length 4 m., greatest breadth 3 m.; pop. about 6,000. It is rocky, but has some fertile patches which are carefully cultivated. Most of the inhabitants are engaged in commerce, and in the war of independence they distinguished themselves by bravery in naval engagements with the Turks. The chief town, of the same name, is a pleasant village on the E. shore, with a good harbor; pop. about 3,000.

**SPHENOGRAMS.** See **CUNEIFORM INSCRIPTIONS**.

**SPHERE** (Gr. *σφαῖρα*), in geometry, a body bounded by a surface, every point of which is equally distant from a point within called the centre. The figure may be generated by the revolution of a semicircle about its diameter as an axis. The surface of a sphere is equal to 4 times the area of a circle of the same diameter; and its solid content to that of a pyramid, whose base is equal to the surface of the sphere, and whose altitude is the radius; hence equal to  $\frac{1}{2}$  of the product of its radius into its surface; or, the cube of the diameter being to the solid content nearly as 300 to 157, the content may be calculated from this proportion, or by multiplying the cube by the decimal .52333.—In geography, sphere denotes a representation of the earth on a globular surface. (See **GLOBE**.) In astronomy, it is the concave expanse of the heavens, which appears as the interior surface of a sphere, of which the centre is the earth.

**SPHEROID** (Gr. *σφαῖρα*, a sphere, and *ειδος*, form), a body resembling a sphere in form, and which may be generated by the revolution of an ellipse about one of its axes. If this be the

conjugate axis, the spheroid is termed oblate; if the transverse axis, it is termed prolate.

**SPHINX**, a fabulous monster of Greek mythology, which was represented generally as having the winged body of a lion and the breast and head of a woman. Sometimes, however, it was represented with a female face, the breast, feet, and claws of a lion, the tail of a serpent, and the wings of a bird; and sometimes the fore part of the body is that of a lion, and the lower part that of a man, with the claws of a vulture and the wings of an eagle; all which forms were used as architectural ornaments. In the legends of the poets the sphinx is said to have been the daughter of Orthus and Chimæra, or of Typhon and Chimæra, or of Typhon and Echidna, and to have come from the most distant parts of Ethiopia. She is also said to have been sent by Mars to avenge the death of his son the dragon slain by Cadmus, or according to others by Bacchus or by Pluto; while others again represent her as one of the women who with the daughters of Cadmus were thrown into madness and metamorphosed into monsters. She was ravaging Thebes and devouring those who could not solve a riddle which she proposed to all whom she met, when Œdipus, being offered the crown of Thebes on condition of delivering the country from the monster, undertook the task and solved the riddle, upon which the sphinx destroyed herself. (See **ŒDIPUS**.)—It is probable that the Greeks derived the idea of the sphinx from Egypt, where from remote antiquity such figures had been used to embellish the avenues which formed the approaches to temples. Among the Egyptians they had the head of a man and the body of a lion, and were sculptured as symbolical representations of monarchs, or, as some suppose, of divine power. Clemens and Plutarch say they were placed before the temples as types of the mysterious nature of the deity. They had sometimes the head of a ram or of a hawk, and sometimes that of a snake with the body of a lion; and they have been found of the times of the 6th dynasty, which according to Wilkinson ended 2240 B. C. The great sphinx at the pyramids is supposed by Lepsius to represent King Cephren, the builder of the 2d pyramid. The Egyptians called it Hor-m-kho or R-m-sho, "the sun in his resting place," which was converted by the Greeks into Armachia. It was carved out of a rock which broke the view of the pyramids, and is near the eastern edge of the platform on which they stand, with its head turned toward the Nile. It is elevated 40 feet above the present level of the soil, and only the head and shoulders are now visible above the sand. Some years ago the sand was cleared away by the explorer Cavaglia; and it was found that in approaching from the river a sloping descent cut in the rock for 185 feet ended in a flight of 13 steps and a level platform, from which another flight of 30 steps descended to the space between the sphinx's fore

paws. The height from the platform between the protruded paws and the top of the head is 62 feet; the paws extend 50 feet, and the body is 143 feet long, being sculptured from the rock, excepting a portion of the back and the fore paws, which have been cased with hewn stone. The countenance is now so much mutilated that the outline of the features can with difficulty be traced. The head has been covered with a cap, the lower part of which remains, and it had originally a beard, the fragments of which were found below. The space between the protruded paws appears to have served as a temple, in which at least in later times sacrifices were performed to the deity. Immediately under the breast stood a granite tablet, and another of limestone on either side resting against the paws. The first contains a representation of Thothmes IV. offering incense and making libation to the sphinx, with a long inscription in hieroglyphics reciting the titles of the king. On the paws are many inscriptions of the Roman times, expressive of acts of adoration to the sphinx or to the Egyptian deities. No opening has been found anywhere in the figure, which is probably of solid rock. "Though its proportions are colossal, its outline," says Denon, "is pure and graceful; the expression mild, gracious, and tranquil; the character is African, but the mouth, the lips of which are thick, has a softness and delicacy of execution truly admirable. That it is an Egyptian head is plainly evident, notwithstanding its mutilation. The type, however, is rather fuller and broader than is usual in Egyptian statues."

**SPHINX**, one of the names of the Guinea baboon (*C. papio*, Desm.). It is rarely seen in menageries, though it is remarkably intelligent; it is probably one of the species represented on the Egyptian monuments. It was known to Pliny. (See **BABOON**.)

**SPHINX CATERPILLAR**. See **HAWK MOTH**.

**SPIOEWOOD**. See **FEVER BUSH**.

**SPIDER**, a division of the insect order *arachnida*, which also includes the mites and scorpions. The general characters of the order, which seems intermediate between crustaceans and insects proper, though nearest to the latter in mode of development, are given in the article *ARACHNIDA*. The external envelope is usually soft and tough, but not corneous, and is provided with papillæ, spines, bristles, and hairs, giving a furry or velvety, but generally disgusting aspect; the inner membrane of the skin is thin and colorless, and under it is a layer of colored vesicles and granules, the seat of the brilliant hues observed in many species. The body is divided into thorax and abdomen, the head is continuous with the chest, and there are no wings. From the inner surface of the cephalothorax are given off various processes serving for muscular insertions, forming at the bottom a solid horizontal plate, a kind of internal skeleton attached to the sternal plates by ligaments. The muscles are dirty yellow, transversely striated, and in

general disposition like those of crustaceans; the principal masses are found in the cephalothorax, acting on the mouth, tactile organs, and legs; in those with an unarticulated abdomen there are numerous interlacing fibres encompassing this part, and sending processes among the organs and to the ventral tendinous ligament. The locomotive organs on the cephalothorax are 4 pairs of legs, of which the first in some resembles a posterior pair of metamorphosed jaws; each foot usually ends in 2 claws, but some have only 1, and others 3 or 4; each leg has usually 7 joints; in some the tarsi have a great number of joints, which can be readily dropped off for the purpose of escape, and are reproduced at the time of the moult. The central part of the nervous system is situated around the œsophagus, sending nerves to the head and limbs; the splanchnic nerves for the viscera are well developed. The antennæ are transformed into the prehensile and masticatory mandibles; a delicate sense of touch resides in the palpi, and in the end of the feet, which are employed in constructing the web; the senses of taste, smell, and hearing, though undoubtedly present, have not been satisfactorily localized in any special organs. The eyes are smooth and simple stemmata, variously placed on the cephalothorax according to the mode of life of the species, usually 8, sometimes 6, of different sizes, grouped symmetrically on the anterior median line or scattered on its lateral border, and directed accordingly upward or laterally; the diurnal species have the pigment greenish, reddish, or dark, the nocturnal having it splendidly lustrous as in the cats. The cheliceres or fangs have the form of bi-articulated antennæ, the basal joint being very thick, and the terminal one a very sharp hook folded under the former when not in use, but capable of erection for defence or seizing prey, and having at the apex the opening of the duct of a poison gland; the 1st pair of maxillæ are changed into very long tactile or prehensile organs, the upwardly directed prominences of whose basal joints cover the entrance of the mouth, and serve as bruising organs; there is also a tumid hairy upper lip; the borders of the oral cavity may be approximated so as to form a suction canal, as well as the very short and horny œsophagus. The stomach is in the cephalothorax, and is divided behind the sucking apparatus into lateral halves extending in an arched manner in front, where they become contiguous or united into a ring, from which are given off 4 or 5 pairs of cæca directed toward the insertion of the legs and palpi; the intestine arises from this annular stomach, traverses the abdomen on the median line, and before ending at the anus forms a cloacal dilatation; salivary glands exist in a cavity above the palate, communicating with the mouth by a slit in the upper lip; the liver is very large, enveloping most of the viscera, of a dirty yellow color, made up of numerous branched and closely aggregated cæca,

opening into the middle portion of the intestine. The blood is colorless; there is a heart, dorsal vessel with many constrictions, arteries, and vessels returning the blood from the respiratory organs. Respiration takes place both by pulmonary sacs and tracheæ, one or the other penetrating all parts of the body and limbs; there are 2 sacs occupying the base of the abdomen, containing more or less lamellæ; the blood penetrates to the respiratory system probably by a kind of infiltration. Distinct urinary organs are present, much ramified glandular tubes pouring a whitish or reddish secretion into the cloaca. There are 2 poison glands at the base of the cheliceres, communicating with their terminal hook. The apparatus which secretes the viscid transparent liquid, hardening into silk on exposure to the air, consists of glandular follicles and tubes, of various forms and arrangement, situated in the midst of the abdominal organs; in most spiders there are 8 pairs (in some 2) of jointed spinnerets or obtusely conical papillæ behind the anus; the apex of these papillæ is surrounded by stiff bristles and hairs, and is dotted with numerous horny tubes, the prolongation of the excretory ducts; the number of the tubes varies from 1,000 in *epieira* to less than 100 in the smaller species. The sexes are separate, and the eggs are numerous and spheroidal; a single impregnation is sufficient for several successive generations. There is generally only one brood in a year; the embryos are developed after the deposition of the eggs, and are hatched sometimes in a few weeks, and at others not till the following spring; the eggs are enveloped in a silken bag, from which the young are sometimes helped out by the mother; they resemble the parents except in size, and undergo no metamorphosis but change of skin; life may be prolonged for several years. Though objects of general aversion and disgust, from their sombre colors, cruel habits, and dismal haunts, spiders are exceedingly interesting animals, and display an adaptation of instinct to surrounding circumstances, which seems very near to reason. Only the system of classification of Walckenaër, who has made a special study of spiders, founded on their habits, will be briefly given here, as it places stress on the most interesting points in their economy, though not affording a sufficient basis for natural classification. He divides the spinning spiders into terrestrial and aquatic, as follows: I. *Venantes*, always running or leaping near their abode in search of prey, with the families: 1, *latebricolæ*, hiding in holes and fissures, like *mygale*; 2, *tubicolæ*, enclosing themselves in silken tubes (*dysdera*, *segestria*); 3, *cellulicolæ*, living in small cells (*scytodes*); 4, *cursoræ*, swift runners (*lycosa*, *ctenus*); 5, *saltatores*, leaping with agility (*attus*). II. *Vagantes*, wandering after prey, without fixed residence except while laying eggs, with family 6, *laterigrada*, walking and running sideways or backward, and occasionally throwing out threads to entrap their

prey (*thomisus*). III. *Errantes*, prowling in the neighborhood of their nests or threads, with families: 7, *niditelæ*, going abroad, but making a web whence issue threads to entrap prey (*clubiona*, *drassus*); 8, *filitelæ*, spreading long threads about their prowling places (*pholcus*, *clothe*). IV. *Sedentes*, spinning large webs and lying in wait in the middle or at the side, with families: 9, *tapitelæ*, spinning large webs of close texture in which they dwell (*tegenaria*, *agelena*); 10, *orbitelæ*, spreading orbicular or spiral webs of a regular open texture, living in the middle or at the side (*pepeira*); 11, *retitelæ*, spinning irregular webs of open meshes, remaining in the middle or on the side (*theridion*). V. *Natantes*, swimmers and spreading filaments in water, with family 12, *aquitelæ* (*argyroneta*). —Spiders are found in every habitable portion of the globe, but are largest in warm climates; the males and females live separately, and the latter are most frequently seen and are considerably the largest; all are carnivorous, devouring living prey, sucking the juices and sometimes swallowing the fragments; the females are generally ready to attack and feed on the males, even in the reproducing season, and both sexes are fond of fighting, the vanquished being devoured; they can support long fasts, and remain torpid during the winter; they are very cleanly, and spend much time in clearing their limbs from dust and dirt by the toothed combs and brushes on the mandibles. In making their webs they accommodate themselves remarkably to circumstances, displaying great perseverance, ingenuity, and almost intelligence; they carefully guard their eggs, sometimes carrying about with them the silken bag which contains them, and are affectionate to their young, which in some cases devour their mother. They descend by their silken threads head downward, but climb up on them head upward, rolling them into a bundle during the ascent; the thread cannot be used a second time for the same purpose. When they wish to go from tree to tree, some let go a thread in the direction of the wind, and when their delicate sense of touch tells them that it has reached the object, they strengthen and pass over it, in this way travelling long distances without descending to the ground; their tiny cables being very abundantly seen in dewy mornings of spring and autumn; some small gossamer spiders even speed through the air buoyed up by their light threads. Savage and unsocial as they ordinarily are, they are capable of some domestication; Pelisson, a prisoner in the Bastille, had a pet spider which came regularly, at the sound of a musical instrument, to get its meal of flies; and a spider raiser in France is said to have tamed 800, which he kept in a single apartment for their silk. The supply of the silk of the spider seems to be limited to sufficient to make 6 or 7 webs in a season; it is very strong and very fine, and is used in astronomy for the divisions of the micrometer; according to Leeuwenhoeck it takes 4,000,000 of

the extremely delicate threads from the thousands of spinnerules to make a filament as large as a human hair; each thread of the spider as used in the web is made up of thousands of smaller ones; one or all the spinnerets may be used as occasion requires. Attempts have been made to render the silk of the spider available for manufacturing purposes, but without success; the web is useful in medicine. (See CONWEB.) Spiders are eaten by many barbarous tribes of men, as the American Indians, S. Africans, and Australians; they also supply abundant food to many birds, reptiles, and carnivorous insects. They are affected and frequently destroyed by parasitic mites, and their eggs serve to nourish the young larvæ of several species of ichneumon flies; the smallest puncture in the chest or abdomen is fatal from the impossibility of arresting the escape of the nutrient fluids; their colors fade rapidly after death, even in preservative liquids. A single wound from a spider will soon kill the domestic fly; the large crab spiders of South America (*mygale*) leap upon and destroy humming birds and creepers, and produce dangerous and occasionally fatal symptoms in debilitated persons; every physician knows that even the bite of the smaller spiders of temperate climates may pierce the skin in certain localities, and cause painful irritation, and there is good reason to believe in some instances death, especially in young children and cachectic individuals.—For descriptions and figures of the species of the United States the reader is referred to the papers of N. M. Hentz, in vols. iv., v., and vi. of the "Boston Journal of Natural History" (1841-'57). The genus *mygale* (Walck.) contains the largest of the spiders, of dark colors, nocturnal in habit, living in galleries which they make in the ground, in clefts of trees, crevices in rocks, or among leaves. The crab or bird spider of South America (*M. avicularia*, Walck.) is about 8 inches long, its legs extending over a space of 8 or 10 inches; the body is very hairy and blackish, and the ends of the feet are reddish; it is very powerful, jumping upon and killing small birds and lizards; it spins no web, but is said to suspend for future use the uneaten remains of its victims by strong cables to the trees; its cell is in the form of a pointed tube, of a white firm tissue. There are some large species in the southern states, feeding principally on the large orthoptera, believed by the Indians to possess valuable medicinal properties, and eaten accordingly. The species of the genus *lycosa* (Latr.) are well called wolf spiders, for they are the most savage, voracious, and quarrelsome of the family; they make no web, but prowl on the ground by night, running very fast, and hiding in natural or artificial holes in the ground, which they strengthen with silk; the females carry the cocoon attached to the posterior part of the body, and defend it with the greatest courage, some guarding it under stones; the young when hatched climb on the abdomen of the

mother, giving her a monstrous appearance, and are said finally to devour her. One of the largest and most common species is the *L. fatigifera* (Hentz), about 1½ inches long, hairy, and bluish black; it is as large as the tarantula of Europe, which belongs to this genus, and is not uncommon in Massachusetts; it must rarely bite persons, from its habits and haunts, though its poison may produce ill consequences if introduced under the skin, not however to be compared with those from the *mygale* of the tropics; it is very savage and tenacious of life. The genus *attus* (Walck.) includes the small-sized species commonly called jumping spiders; they make no web, wander in search of prey, and cast the skin and hibernates in silken-valved recesses; they are common in summer on walls and windows in the sun, walking by jerks, crawling stealthily up to flies, and jumping with rarely failing accuracy when near enough. The best known jumping spider in New England is the *A. familiaris* (Hentz), about ½ inch long, pale gray and hairy, the abdomen blackish with a grayish angular band; it is very common in houses, dwelling in cracks on the outside, and wandering about in the sun in search of food; before leaping at a fly, it fixes a thread to secure itself from falling. It is widely distributed. Its backward gait is as rapid as its forward. The long-legged spider (*pholcus Atlanticus*, Hentz) is about ½ inch long, with a narrow body and very long slender legs, which are easily separated at the will of the animal when seized by them; the color is pale gray; it is common in corners of dark and rarely used rooms, in cellars and churches, spinning a very loose web crossed in all directions, which is very rapidly shaken when touched; the eggs are carried in the jaws, enveloped in a silken bag, and about 200 young are rolled in a ball not larger than a pea; the food consists of very small insects, though they eagerly devour each other, especially when young; they are favorite food for wasps, who store their cells with them as a provision for their young. The European representative is the *P. phalangioides* (Walck.). The common house spider (*tegenaria medicinalis*, Hentz) is well known, being found in every house and cellar in the land; the cheliceres are moderate, and the 4th pair of feet the longest; the upper 2 spinnerets are remarkably larger than the others, and the 4 anterior eyes in a line curved backward. It is sedentary, making in an obscure corner a large and nearly horizontal web, with a tubular habitation at the upper part; it is not quite an inch long, varying in color from pale brown to bluish black according to the absence of light in their retreats, with a dark band on each side of the thorax, and the abdomen and feet varied with blackish; the specific name is derived from the use formerly made of the web in cases of fever. In *peira* (Walck.) the web is either vertical or inclined, and the threads are arranged in a more or less regularly geometrical manner, radiating from

the centre where the animal remains, according to the absence of disturbing causes. It was into a spider of this genus that the ill-fated Arachne was transformed by Minerva, according to Ovid; and it was also this that saved the life of Mohammed by making its web at the entrance of the cave where he was concealed. The common *epeira* (*E. vulgaris*, Hentz) is less than an inch long, with a full body, gray with blackish abdomen, with winding white marks and a white cross in the middle; it may almost be said to be domesticated, its geometrical web being so often met with near the windows of houses.—The long-legged, round-bodied spider, commonly called "father long-legs," is one of the trachearian arachnids, so named from the respiratory organs being radiated tracheæ, receiving air through 2 stigmatic openings; it is the harvest spider (*phalangium cornutum*, Linn.) in Europe, and an allied species in the United States. The eyes are 2; the mandibles end in double pincers; the legs are 8, slender, and when separated from the body exhibit signs of irritability for some time. They are harmless, preying upon mites and small insects, and are very common in the fields.—For further details see chap. xviii. of Rennie's "Insect Architecture," the works of Kirby and Spence, and particularly the *Histoire des insectes aptères* (*Nouvelles suites à Buffon*), by Baron Walckenaër (vols. i., ii., and iii., 8vo., Paris, 1837-'44). (See MITRE, and SCORPION.)

SPIDER CRAB, or SEA SPIDER, the name of several species of 10-footed short-tailed crustaceans of the crab family, and more particularly of the *libinia canaliculata* of North America and the *maia squinado* of Europe. In *L. canaliculata* (Say) the thorax is densely hairy, with spines on the borders and on the back; the rostrum is grooved at the tip and channelled between the eyes; the anterior feet are unarmed and granulated, the hands elongated, and the fingers white at tip. The body is convex and heart-shaped, 4 inches in diameter, the long legs spreading over 12 to 16 inches; the eyes small and very short; it is blackish green, very active, and ferocious-looking; it is often caught in nets, and from the wharfs and bridges of New England; it is not used for food. The *M. squinado* (Latr.), or corwich, is of a reddish color, and 4 to 6 inches long; the body is covered with spines and hairs; it is found along the coasts of W. Europe and in the Mediterranean, making its appearance in Great Britain about May and remaining till September, greatly annoying the fishermen by frightening away fish and larger crabs and lobsters from the nets by its constant movements; its flesh is not esteemed, though it is eaten by the poorer classes; the young when first hatched are very unlike their parents; as many as 80,000 eggs have been found on a single female. The ancients believed it to be endowed with reason, and represented it suspended from the neck of Diana of Ephesus as an emblem of wisdom; it is also figured on

their medals.—*Lithodes arctica* (Latr.) is also called spider crab; the body is spiny, and the long beak bifurcated; the hands small and unequal, the limbs long and hairy, and the 5th pair imperfect; it is reddish yellow, spreading about 20 inches, and a hideous-looking species; it is found on the coast of Norway.

SPIKE. See NAIL.

SPIKENARD (Lat. *spica*, spike, and *nardus*, nard), a name given by the ancients to a variety of aromatic roots, more particularly designated by the additional mention of their localities, and supposed to belong to the valerian family. The name is now applied to an herbaceous plant belonging to the ginseng family, and designated *aralia racemosa*. It grows in rich woodlands in the United States, and is well known for its large, spicy, aromatic roots. It resembles in its properties the *A. nudicaulis*, or wild sarsaparilla, and both the roots and the berries are used for preparing a tincture, which is held in repute as an aromatic tonic, a gentle stimulant, and diaphoretic, though probably possessing little virtue.—The spikenard of the East Indies is a small plant with a long hairy tap root (*nardostachys jatamansi*); it is used as a medicine, and also as a perfume. The European ploughman's spikenard (*inula conyzia*) grows on limestone soils, and is noted for its volatile oil of peculiar scent, which is especially offensive to fleas, gnats, &c.

SPINACH (*spinacia oleracea*, Linn.), an herbaceous pot herb of the chenopodiaceous order, having hollow and branching stems a foot or more high; hastate or oblong ovate leaves; polygamo-dioecious flowers, the barren in long spikes and apetalous, the fertile in clusters close to the stem near the joints; the calyx 4-parted, the stamens 4, styles 4, seed vessel cohering to the calyx, the seed round or spiny. There are 3 forms, known as the common, the smooth, and the prickly, the last being the hardiest, while the smooth is mostly raised for summer crops. Spinach prefers a well pulverized, moist, and rich soil; the seed should be sown thin, and the young plants thinned out and kept free from weeds. Its native country is the Levant.

SPINAL CORD. See NERVOUS SYSTEM, vol. vii. pp. 189, 190.

SPINAL DISEASES. The spinal column is mainly kept in an erect position by the action of the muscles inserted into it; when these muscles are enfeebled in consequence of long disuse, the spine is apt to become abnormally curved. Lateral curvature is generally the form of disease thus produced. It is exceedingly rare among those who take proper exercise and are much in the open air. Any considerable degree of it is not common in the male sex, but it is very general among growing school girls and among women confined to sedentary occupations. In them it depends partly on the want of proper physical training, partly on the prevalent mode of dress, which hampers the free movements of the arms, and

maintains the trunk in a state of unnatural repose. When the muscles are thus enfeebled, young girls attempt to obtain relief from the weariness they suffer while standing or sitting by leaning to one side, by supporting themselves on one leg while the shoulder on the opposite side is elevated, &c. When such habits are once formed, lateral curvature soon makes itself evident. This is always double; that is, if there be in the lumbar region a curve to the left, there will be, in order to maintain the equilibrium of the body, a corresponding curve in the dorsal region to the right. The spinal column in such cases, when viewed from behind, presents more or less strongly defined the form of the letter S. As a secondary result, lateral curvature arises from hip joint disease, disease of the knee, shortening of one of the lower extremities, &c. It sometimes occurs too in artisans who are in the habit of using mainly the muscles of one side of the body, which thus become abnormally developed, and draw the spine out of the perpendicular. The symptoms produced by lateral curvature are rather those of the debility and muscular atony which produce it; the deformity, unless it be extreme and thus lead to interference with the functions of the viscera, rarely gives rise to pain or other symptoms, but the patient suffers from weakness and weariness alone. The existence of curvature of the spine is readily ascertained by inspection; on stripping the patient and looking at him from behind, the lateral deviation of the spinal column is at once evident. There will be a fullness of the side toward which the spine deviates, and a sinking in of the opposite one; an elevation and projection of one shoulder, and a fullness and apparent elevation of the opposite hip. The two mammæ will not be in the same horizontal line, and one side of the chest will be fuller and the other more depressed than natural. Slight cases of spinal curvature are best managed by merely hygienic measures, improving the general health by fresh air, sea bathing, and proper diet, and restoring tone to the debilitated muscles by regular and systematic exercise. When the deformity is very great, the instrument maker must be called in to aid in straightening the spine and in supporting the superincumbent weight which tends to increase the curvature, while means calculated to improve the general health and restore the power of the enfeebled muscles must be steadily pursued.—*Scrofulous caries of the spine, or Pott's disease.* In strumous subjects the bodies of the vertebrae are liable to tubercular deposit and to consequent inflammation and caries. Though it may occur at any period of life, it is eminently a disease of early childhood, and rarely commences after puberty. The disease most commonly attacks one or more of the dorsal vertebrae; more rarely it affects the cervical region, and least frequently of all the lumbar. The patient at first is weak and languid, and seems indisposed to take exercise. After a time

a dull aching pain in the affected part is complained of, particularly after exercise or when the patient is subject to any jar or concussion; this pain is relieved by rest and the horizontal position. From deficient innervation the patient cannot walk as firmly as usual; the feet cross each other, and he is apt to trip and stumble. There is sometimes spasmodic twitching of the muscles of the lower extremities, or occasionally they may be rigid, while alterations of the sensibility of the parts may sometimes be noticed. With these symptoms the general health is impaired, the patient becomes pallid, and the nutrition of the body is deficient. It must be remembered, however, that some cases pass through their whole course without the patient complaining of pain in the affected part. In the second stage of the complaint, while the previous symptoms continue or are aggravated, curvature of the spine, at first trifling, but gradually increasing, becomes noticed. This curvature is peculiar and characteristic; it is not gradual and rounded, but sharp, abrupt, and angular. It is caused by the gradual absorption of the bodies of one or more of the vertebrae, the approximation of those above and below to fill the vacant space, and the consequent sharp projection of the spinous processes. As the disease advances, the parts supplied with nervous influence by the portion of the spinal marrow situated below the seat of disease are apt to suffer more or less from paralysis. Sometimes the paralysis is complete, and motion and sensation are alike abolished; when this is the case, the patient loses control over the sphincters of the rectum and bladder, and the urine and feces are both passed involuntarily; when the disease is situated high up, the functions of both digestion and respiration may be interfered with. When the paralysis is partial, motion suffers earlier and more severely than sensation; and as recovery takes place, sensation is completely restored long before motion. In the progress of the disease suppuration is apt to occur, and the matter, making its way along the psoas or internal iliac muscles, most frequently shows itself at the groin or at the anterior part of the thigh below Poupert's ligament. The occurrence of suppuration is attended with increased general disturbance of the economy and with hectic fever, and is commonly a fatal symptom. When the diagnosis is certain, the treatment of scrofulous caries of the vertebrae, if not always satisfactory, is sufficiently simple. Ankylosis of the vertebrae is the most favorable termination to be looked for, and to favor its occurrence, and at the same time to prevent the irritation caused by any disturbance of the diseased parts, the patient must be kept in the horizontal posture, if possible upon a couch which will admit some change of position of the limbs and trunk without risk of moving the diseased bones upon each other. Moderate counter-irritation by means of setons or strips of blistering plaster may be employed in the



neighborhood of the seat of the disease. The diet should be nutritious and digestible, with a liberal allowance of red meats, and sometimes of ale or wine. Iron, cod liver oil, the phosphates, and tonics will be useful.—*Spinal meningitis.* Though rare, inflammation of the meninges of the spine occasionally occurs without any complication with brain disease. The invasion of the disease may be preceded by feelings of languor and discomfort, or sensations of creeping and pricking may occur in the extremities. The patient is then seized with violent pains in the lower extremities and along the spinal column, increased by motion but not by pressure. The pain is often of a darting, lancinating character, and the general sensibility is often very much exalted. After a time tetanic contraction of the muscles of the spinal column, extending commonly to the limbs, takes place; more rarely clonic convulsions occur. The respiration is frequent and difficult, the pulse quick, the skin bathed in sweat. The disease is generally fatal, death commonly taking place within a week from the invasion. Local blood-letting, opiates, and mercurials are the remedies generally recommended; but aconite and conium are employed by homœopathists as the most antagonistic medicines.—The spinal marrow may be attacked by sanguineous congestion. In such cases sudden paralysis occurs, limited sometimes to the upper extremities, which may disappear again at the end of a few hours. When the paralysis lasts for weeks or months, there is always some doubt of the correctness of the diagnosis. The treatment consists of the application of cupping glasses in the neighborhood of the affected parts, of blisters, &c., and lastly of cathartics. In some cases it may be proper to resort to the slow and moderate induction of the mercurial influence.—*Apoplexy from hemorrhagic effusion in the spinal canal.* According to Ollivier, the first symptom is invariably a sharp pain at the part of the cord corresponding to the hemorrhage. "At the moment of the attack the patient falls suddenly, but without losing his consciousness, struck with paralysis." The paralysis affects the motor nerves more than the sensory; it affects both sides of the body. When the effusion occurs in the lumbar region, the lower extremities alone are paralyzed; higher up, it affects the functions of the bladder and the rectum; if in the cervical region, paralysis of the upper extremities, difficulty of breathing, and impending suffocation are noticed.—*Softening of the spinal marrow,* preceded or not by inflammation of its substance (*myelitis*), is a rare disease, with the history and character of which we are not yet thoroughly acquainted. It is marked by a gradually increasing paralysis of the parts whose nervous influence is supplied by the portion of the spinal marrow below the seat of the disease.

SPINDLER, KARL, a German novelist, born in Breslau, Oct. 16, 1796, died at the baths of Froiersbach, July 12, 1855. He was educated

at Strasbourg, returned to Germany to avoid the French conscription, lived for a time at Augsburg, joined a company of strolling players, and produced several dramas. Devoting himself afterward to novel writing, his most successful productions were the historical romances *Der Bastard* (3 vols., Zürich, 1826), of the period of the emperor Rudolph II., *Der Jude* (4 vols., Stuttgart, 1827), of the time of the council of Constance, and *Der Jesuit* (3 vols., Stuttgart, 1829), of the 18th century. He had remarkable facility, and his novels form more than 100 volumes, beside which he edited about 300 volumes of translated novels, and alone wrote the *Vergissmeinnicht*, a periodical medley (*Taschenbuch*), from 1830 till his death. Among the best of his later romances are the *Boa Constrictor* (1836), *Der Vogelhändler vom Imbst* (1842), and *Fridolin Schwertberger* (1844-'5). Menzel calls him the best German imitator of Sir Walter Scott.

SPINE, the chain of bones in the vertebrate skeleton extending from the head to the sacrum in man, protecting the spinal cord in its bony canal, occupying the posterior part of the trunk, giving attachment to muscles, and supporting the framework of the thoracic cavity. In man it is composed of 24 bones, 7 cervical, 12 dorsal, and 5 lumbar, according as they are situated in the neck, back, or loins; the sacrum and coccyx belong also to the spine, and in many of the lower animals are not distinguishable except by size and position. Each vertebra has a body, convex in front, flat above and below, where it is joined by intervertebral cartilages to the others of the chain; from this spring the processes which, continued backward, form the laminae enclosing the vertebral canal, surmounted by the spinous processes; on the sides are 2 transverse processes directed outward, and 4 articular processes, 2 above and 2 below, and 4 grooves more or less deep for the exit of the spinal nerves. The cervicals may be known by the foramen in the transverse processes of the vertebral artery, the dorsals by the articular surfaces for the ribs, and the lumbar by their large size; the atlas or 1st cervical has the form of an irregular ring, and the axis or 2d the odontoid process rising vertically from the body, between these two the rotatory movements of the head being performed, and the nodding movements between the atlas and the occiput; the 7th cervical has a very long and prominent spinous process, easily perceived through the skin, and often an important guide in surgery; the last lumbar has its body cut obliquely on the lower surface from before backward and from below upward, and is much the thickest in front, for more advantageous articulation with the sacrum. The spine forms about  $\frac{1}{4}$  the total length of the body, the neck in a person 6 feet high being about 6 inches, the back 12, and the loins 6. It is convex in front in the neck, concave in the back, and convex in the loins; there is also a slight lateral curvature in the

dorsal region, arising from the right arm being more actively exercised than the left; it has the form of an irregular truncated pyramid, the base resting on the sacrum and the apex supporting the head; upon its anterior surface in the trunk are supported the aorta, lower vena cava, and the great nervous ganglia.—For details see COMPARATIVE ANATOMY, PHILOSOPHICAL ANATOMY, and MAMMALIA.

SPINEL (Fr. *spinelle*), a mineral, sometimes ranked among the precious stones, occurring in regular octahedrons and dodecahedrons, variously modified; hardness, 8; specific gravity, 3.5 to 4.0. The color is commonly some shade of red, but is sometimes blue, green, yellow, brown, black, and rarely almost white. When pure, it is a compound of magnesia 28, alumina 72; but the magnesia is often replaced to some extent by one or more of the protoxides of iron, zinc, or manganese, or by lime, and the alumina also by peroxide of iron; hence the numerous varieties of the species. These are denominated according to their colors, and some among them are often supposed to belong to other species. The black varieties are called pleonaste; the scarlet, spinel ruby; the rose red, balas ruby; the yellow, or orange red, rubicelle; the violet, almandine ruby; and the green, ceylanite. The *goutte de sang* of the jewellers is of blood red or cochineal color. The mineral is infusible before the blowpipe alone, and is not attacked by acids. The most valuable spinels are found in Ceylon, Siam, and other eastern countries, in the form of rolled pebbles in river beds. A remarkable region for spinels is the N. W. part of New Jersey, extending from Andover in Sussex co. to Amity and Warwick over the state line into New York. The crystals are found of very various colors, and sometimes very beautiful. The rocks are granular limestone and serpentine. At Amity crystals have been found 16 inches in diameter, and one of 49 lbs. weight. Other localities of the mineral are in Antwerp, Jefferson co., N. Y., Gouverneur, St. Lawrence co., and some towns in central Massachusetts. Perfect specimens fit for jewelry are rare; if of more than 4 carats, they are sometimes rated as worth half as much as diamonds of equal size. The red varieties are said to be sold for true rubies, from which they are with difficulty distinguished; and many of the others are often confounded with other precious stones of similar hardness and specific gravity. The optical properties alone may decide without analysis between the colorless spinel and the limpid topaz of Siberia. Dufrénoy was obliged to apply the test of polarization of light to a white cut spinel from India, which was supposed to be either a diamond or a white emerald. He describes one of a clear crimson with a violet tint, weighing 1,129 grains, of great beauty, valued at 100,000 to 110,000 francs.

SPINET, an ancient musical instrument resembling the harpsichord, by which it was superseded as early as the 16th century. Its general

form is that of a harp, and it was originally called the couched harp.

SPINNING. See COTTON MANUFACTURE, LINEN, and ROPE.

SPINOLA, AMBROSIO, marquis of, a Spanish general, born in Genoa in 1569, died at Castelnovo di Scrivia, Sept. 25, 1680. He succeeded his father in the mercantile business, but at the solicitation of his brother Federico, admiral of the Spanish fleet on the coast of the Netherlands, entered the military service of Spain in 1602, raised and equipped a corps of 9,000 Italians and Spaniards, and shortly afterward went to the Netherlands, serving at first under Mendoza. In 1608 he was appointed commander-in-chief of the Spanish army in the Netherlands. In 1604 he closed the siege of Ostend, achieving a brilliant victory. This siege lasted 3 years, and cost 130,000 lives to the besiegers. He captured Jülich in 1622 and Breda in 1625. Subsequently he served in Italy against the French. His death is said to have been hastened by disappointment at the neglect of the Spanish government to satisfy his heavy claims incurred in fitting out and paying the troops under his command.

SPINOZA, BARUCH, or BENEDICT, a Dutch philosopher of Jewish descent, born in Amsterdam, Nov. 24, 1632, died at the Hague, Feb. 21, 1677. His Hebrew name Baruch was by himself translated into Latin as Benedictus. His father, a flourishing merchant, had escaped to Holland from persecution in Portugal, where the family had previously resided. At first intended for commerce, his passion for study as well as his slight physical constitution induced his parents to educate him for the rabbinical profession. It is remarked by Kuno Fischer that the 3 earliest continental philosophers of modern times received their impulse from religion: Descartes was a pupil of the Jesuits; Malebranche studied in the oratory of Paris; Spinoza was a disciple of the Talmud. The interest with which Spinoza devoted himself to the Jewish theology, and his remarkable capacity, won the admiration not only of the masters of the Hebrew school in Amsterdam, but also of the chief rabbi Morteira, who became his instructor in the Talmud and the cabala. Though he spoke with reserve on religious matters, he was suspected even before his 15th year of verging toward heresy, and two of his schoolfellows reported his first statements of the doctrine of unity of substance in the universe in such a way that he appeared to condemn the law of Moses, and to deny the immortality of the soul and the reality of angelic communications. Summoned before the judges, he was neither moved by words of kindness nor deterred by threats; and when Morteira vowed "to return with the thunderbolt in his hand," he anticipated excommunication by withdrawing himself from the synagogue. He turned from Jewish to Christian associations. The synagogue hoped to retain him by an offer of 1,000 florins annually for his silence and occasional attendance

at their ceremonies. He rejected it with the assertion that he sought not gold but truth, and soon afterward an attempt was made to assassinate him in the street, but he parried the blow. He neglected the repeated summons of the synagogue to trial, and at length in 1655 the *anathema maranatha*, or greater excommunication, was uttered against him with an awful ceremonial, and before a vast assembly. His studies had already taken a wide range. He was familiar with the Portuguese, Spanish, Italian, German, and Flemish languages, and was studying Latin under the physician Van Ende, celebrated by his tragic death. This language introduced him not only to Christian learning, but also to the literature and philosophy of classical antiquity, then studied with special enthusiasm. A more important result was that it opened to him the writings of Descartes. It was while in the house of Van Ende, who was charged with taking a profane if not atheistic view of all science, that his final rupture with Judaism occurred. He fell in love with the daughter of his master, who, however, married a Hamburg merchant. The Talmud makes it the duty of scholars to learn some mechanical art. Spinoza had therefore, while in the synagogue, learned the art of polishing glasses for telescopes, microscopes, &c., in which he attained eminent proficiency, and by which he gained his subsistence during the remainder of his life. Exiled from Amsterdam by the magistrates on application of the rabbins, he lived for a short time with a friend in the vicinity, went thence to Rhynsburg, near Leyden, whence in 1664 he removed to Voorburg, near the Hague, and finally yielded to the request of his friends to reside entirely at the Hague. "All his time," says Colerus, "was spent in meditation and in working on glass," the leisure derived from his trade being given to philosophy. Renouncing his parents and early friends, his national faith, and domestic happiness, he presents a remarkable example of independence and persistency of thought in poverty and solitude. His friend Simon de Vries wished to make him heir to a large property, but was persuaded by him to leave it in preference to his brother. After the death of his parents, he transferred his share of the inheritance to his sisters. In 1673 the professorship of philosophy in the university of Heidelberg was offered to him, the condition being that he should teach nothing opposed to the established religion; but he declined it on the ground that the duties would interfere with his task of free speculation. When it was proposed to obtain a pension for him from Louis XIV., he replied that he had nothing to dedicate to that monarch. Yet, while renouncing these advantages, he endured the toil and wants of poverty, was wont to protract his labors into the night, and lived on the slightest sustenance. His first work was entitled *Renati Des Cartes Principiorum Philosophiæ Pars I. et II., More Geometrico Demonstrata* (Amsterdam, 1663). It

is still one of the best expositions of the Cartesian philosophy, and contains in an appendix the germ of his own *Ethica*. It immediately gave him the reputation of a great philosopher; his friendship was sought by the learned, and by men of distinction in public life, as Jan de Witt and Condé. His second work, entitled *Tractatus Theologico-Politicus*, published anonymously in 1670, treats the relation between church and state, and is entirely distinct from his philosophical writings. Religion, he maintains, is neither doctrine nor *cultus*, but is essentially the love of God, the expression of which is piety and obedience, and its worship is virtue. Doctrines belong to the domain of philosophy, actions to that of the state, feelings to that of religion. Absolute freedom should prevail in the first and the last, while the second should be regulated by the state in the interest of order and tranquillity. He therefore advocated a state religion, which should ordain ceremonials, but not private creeds, and leave liberty of thought inviolate by laws of observance. This view is substantially the same as that urged in England by Dr. Arnold. He referred to the Bible for support of his opinions, and was thus led to discuss its authenticity, to distinguish between the facts narrated and the coloring received from the minds of the writers, and thus to lay the foundation of the rationalist school of interpretation which afterward flourished in Germany. In the *Tractatus* and in the letters to Oldenburg concerning it are contained, according to Quinet, the germ of all the exegetical principles of Strauss, who styled Spinoza the father of speculative theology. The work was condemned by the church, the synagogue, and the state; numerous refutations of it appeared, especially from Cartesian theologians; yet it was distributed and read throughout Europe. It was published and translated with divers devotional, historical, antiquarian, and even medical titles employed to disguise it. Averse to controversy, and reaping nothing but assaults from publication, Spinoza withheld his other and more important works, which were first published after his death by his friend Ludwig Meyer, a physician of Amsterdam. His health, never vigorous, suffered from unremitted confinement and devotion to study. He sometimes passed entire months without leaving his chamber, occupied only with meditation, conversation with his friends, and answering letters on philosophical subjects. In a letter dated July 15, 1676, he promises further explanations "if my life be continued." In the following year the phthisis, from which he had long suffered, assumed a dangerous character. On the Sunday morning of his death he conversed with his host and hostess, and urged them to attend church, reminding them of the special obligation of religious duties. He often impressed on children the duty of religious observances as well as of obedience to parents, and had previously thus answered a doubt of his hostess: "Your

religion is a good one; you ought not to seek another, nor doubt that it will secure your salvation, provided that you add to your piety the tranquil virtues of domestic life." At noon he again conversed with them, while smoking, asking them as usual what profit they had derived from the sermon. He died during their absence in the afternoon, in the presence only of a physician whom he had summoned from Amsterdam. Calumnies were current; his brother was detained in Amsterdam by illness; a sister named Rebecca was absent, though making inquiries concerning the inheritance; yet his funeral was attended and conducted by illustrious friends. His manuscripts were, in accordance with his order, sent to his publisher at Amsterdam, and within a year appeared his posthumous works: *Ethica*, *Ordine Geometrico Demonstrata*, containing his philosophical doctrine, which had been written between 1663 and 1666; *Tractatus de Intellectus Emendatione*, and *Tractatus Politicus*, both of them fragments; a collection of letters to Oldenburg, Simon de Vries, Ludwig Meyer, and Bleyenbergh; and a fragmentary sketch of Hebrew grammar, aiming to give it a logical development. He was of medium stature, with dark hair thickly covering an oval head, black, small, brilliant eyes, long eyebrows, and pointed chin, his features marking at once his southern and oriental descent. His countenance was constantly pervaded with traces of suffering and deep thought, the *stigma reprobationis* of Colerus, but, according to Hegel, the signet of a philosopher who rejected the errors and passions of mankind.—The fame of Spinoza has had a remarkable fortune. At first a general cry of horror was raised against him. He was represented in portraits with livid and grimacing countenance and snaky hair, bearing the inscription: "Spinoza, Jew and Atheist." Bayle called him a systematic atheist, and Leibnitz the acute but profane author of a wretched doctrine; Malebranche termed his system a chimera, both ridiculous and terrible; and Massillon inveighed against him as a monster. Germany has since witnessed the rehabilitation and almost the apotheosis of his name. To his influence have been attributed the pantheistic tendencies of Herder and Schleiermacher, the philosophical schemes of Schelling and Hegel, and the reverent contemplation of nature which underlies the poetry of Goethe and Wordsworth, which has inspired modern landscape painting, and which has prompted the attainments in physical science in the present century. Schleiermacher says: "Offer reverentially with me a lock of hair to the manes of the holy but proscribed Spinoza. The Divine Spirit transfused him, the infinite was his beginning and end, the universe was his only and everlasting love. In holy innocence and deep humility he mirrored himself in the eternal world, and saw also how he was its noblest mirror. Full of religion was he, and full of a holy spirit, and therefore he stands alone and unrivalled, master in his

art, but exalted above profane society, without disciples and without even citizenship."

—The whole system of Spinoza is a demonstration from the 8 definitions and 7 axioms of the first book of the *Ethica*. "No treatise," says Mr. Hallam, "is written in a more rigidly geometrical method. It rests on definitions and axioms, from which the propositions are derived in close, brief, and usually perspicuous demonstrations. The few explanations he has thought necessary are contained in scholia. Thus a fabric is erected astonishing and bewildering in its entire effect, yet so regularly constructed that the reader must pause and return on his steps to discover an error in the workmanship, while he cannot also but acknowledge the good faith and intimate persuasion of having obtained the truth which the acute and deep-reflecting author everywhere displays." The following are the definitions and axioms: *Definitions*. 1. By a thing which is its own cause, I mean a thing the essence of which involves the existence of it, or a thing which cannot be conceived of except as existing. 2. A thing finite is that which can be limited by another thing of the same nature; *e. g.*, a body is called finite, because it can always be conceived as larger. But body does not limit thought, nor thought limit body. 3. By substance I mean that which exists in itself, and is conceived of by itself; the conception of which does not involve the conception of any thing else as the cause of it. 4. By attribute I mean what the intellect perceives of substance as constituting the essence of substance. 5. By mode I mean the accidents (*affectiones*) of substance, by which it is conceived. 6. God is a being absolutely infinite, a substance consisting of infinite attributes, each of which expresses an infinite and eternal essence. Explanation: I say absolutely infinite, not infinite *suo genere*; for of what is infinite only *suo genere* the attributes are not infinite but finite; but that which is absolutely infinite contains in its own essence every thing which implies essence and which involves no impossibility. 7. That thing is free which exists by the sole necessity of its own nature, and is determined in its operation by itself only. That thing is not free, but necessary, which is called into existence by something else, and is determined in its operation according to a fixed and definite method. 8. Eternity is existence itself, as following necessarily and solely from the definition of the thing which is eternal. Explanation: Because such existence is conceived as an eternal verity, and therefore cannot be explained by duration, even though the duration be without beginning or end. *Axioms*. 1. All things that are, exist in themselves or in others. 2. That which cannot be conceived as existing through another, must be conceived through and in itself. 3. From a given cause an effect necessarily follows, and if there be no given cause no effect can follow. 4. The knowledge of an effect depends on the knowledge of the cause, and includes it. 5.

Things that have nothing in common with each other cannot be understood through one another; that is, the conception of one does not involve that of the other. 6. A true idea is one that corresponds with its object (*cum suo ideato*). 7. The essence of any thing which can be conceived as non-existent does not involve existence.—Such is the outfit of simple metaphysical ideas, from which the system is evolved in a series of theorems. It follows from the definition of substance that it is necessary and infinite, that it is one and indivisible, and that it is therefore God, the only self-existent, all-perfect, and absolutely infinite Being. Nothing exists except substance, and the modes of its attributes. Substance cannot produce substance, and therefore there is no such thing as creation, no beginning or end, but all things have necessarily flowed from the Infinite Being, and will continue to flow on for ever, in the same manner as from the nature of a triangle it follows, and will follow from eternity to eternity, that the angles of it are equal to two right angles. Of the infinite number of infinite attributes of Deity, only two are known to us, extension and thought, the objective and subjective of which he is the identity. Body is a mode of extension, which being illimitable cannot be divided; thought is also infinite, and mental acts are modes of it. It follows also that God is the only free cause (*causa libera*); all other things and beings move by fixed laws of causation, without free will or contingency. He is the *causa immanens omnium*, not existing apart from the universe, but expressed in it, as in a living garment. As conceived in his attributes simply and alone, he is *natura naturans*; as conceived in the infinite series of modifications which follow from the properties of these attributes, he is *natura naturata*. Between bodies, the modes of extension, and ideas, the modes of thought, there is a constant parallelism. The duality everywhere appears, and a soul belongs alike to animals, vegetables, and minerals. Man is a complex example of this compound. There is no reciprocal influence between the bodily and the ideal world, but a perfect harmony, since it is the same substance, affected in the same manner, but expressed under each of the two attributes. Individual beings, whether ideas or bodies, are modes, the changing forms of substance, to which they are related as wavelets to the ocean. The finite has no existence as such, substance is not made up of modes, but is prior to them, and Hegel therefore remarks that he rather denies the existence of the material universe than identifies God with it. The human mind has two chief ways of knowledge, the intuitive through the reason, and the imaginative. The imagination, which deals with the objects of experience, represents the world as a multiplicity of individuals. It obtains a partial and inadequate view of the images which appear before it, considers modes as things, and names them man, horse, tree, &c. The reason sees together in

their unity what the imagination isolates and individualizes, and attains to adequate or exhaustive knowledge, to universal or divine ideas, which are pure thoughts, not involving the conception of extension, and not consisting in images or words. The mind is passive and in bondage in so far as it is influenced by inadequate ideas, and is active and free in so far as its ideas are adequate. If all objects of knowledge be regarded in their relations to the one absolute Being, the knowledge of particular outward things, nature, life, or history, becomes in fact a knowledge of God; and the more complete such knowledge, the more the mind is raised above what is perishable in the phenomena to the idea which lies beyond them. It dwells exclusively upon the eternal, is occupied with everlasting laws, emancipates itself from the conditions of duration, and secures its immortality, by becoming "of such a nature that the portion of it which will perish with the body, in comparison with that of it which shall endure, shall be insignificant." The law of passion is that all things desire life, seek for energy, for fuller and ampler being. Every single being pursues that which will give it increased vitality. Man gathers life and self-mastery only from the absolute Being; the love of God is the extinction of all other desires; and virtue is the knowledge and power of God in the human soul, the exhaustive end of human aspiration. The ethical principles in which the philosophy of Spinoza results were proposed by him as identical with those of the Christian religion. Kuno Fischer thus criticizes the system. By substance is meant the real and absolute power of nature, by which all things are held in the chain of causality. By idea of substance is meant the knowledge of this power, the fundamental principle in our logical system of things. Between these two, the power in the natural system and the principle in the logical system, there is no connection. To grasp a principle, some intelligence is needed which does not exist in the universe; for the substance thinks only of its essence, but not of its manifestations, and all finite things are but unreal modes. As there is nothing but substance and mode, there is nothing in which the idea of substance can inhere. Spinoza therefore proposes this idea as the basis of philosophy and religion without establishing it, and even in connection with a scheme of the world which renders it impossible. Either the logical or the natural system of things must be rejected. But in retaining both, Spinoza has violated his theory of the unity of the universe, and has actually, and contrary to his intention, maintained a dualism of substance and mode, of divine power and finite things. The exigencies of his philosophy require that modes, individuals, should be regarded as causes instead of operations, as independent but essentially similar substances. To recognize this necessity and to attempt to harmonize the finite and infinite, without denying the reality

of either, was the task of Leibnitz.—The life of Spinoza was written by Colerus, pastor of the Lutheran church at the Hague (1706), Boulainvilliers (Brussels, 1731), and Saisset (Paris, 1842). Among the more important works on his philosophy are: Jacobi, *Ueber die Lehre des Spinoza* (Berlin, 1785); Herder, *Gott, einige Gespräche* (Gotha, 1787); Sigwart, *Der Spinozismus historisch und philosophisch erläutert* (Tübingen, 1839); and Kuno Fischer, *Geschichte der neuern Philosophie*, vol. i. (Mannheim, 1854). His works were edited in the original Latin by Paulus (2 vols., Jena, 1802-'3) and Gfrörer (Stuttgart, 1831). A translation into German was published by Auerbach (1841), and into French by Saisset (1843). G. H. Lewes is stated to be preparing a translation of them into English, with annotations.

**SPIRAL VESSELS.** See **AIR VESSELS**.

**SPIRE**, or **SPIRES** (Ger. *Speier*, or *Speyer*; anc. *Civitas Nemetum*, or *Noviomagus*), a town of Bavaria, capital of the Palatinate, situated on the left bank of the Rhine, at its junction with the Speierbach, 16 m. N. E. from Landau; pop. about 10,000. It is surrounded by walls and entered by 5 gates, but a large extent of the ground enclosed is either vacant or occupied with gardens. The cathedral is a very extensive edifice, in the Romanesque style, and the E. end is part of the original building founded

by the emperor Conrad II. in 1027. Many of the German emperors are interred between the nave and choir, and many monuments have been erected to their memory. The interior is decorated with frescoes by modern German artists, and some of the works are of great merit. At the N. E. of the cathedral there is a museum of antiquities, which contains many remains found in the neighborhood. Very little is now left of the old imperial palace, where in 1529 the diet was held at which the Reformed princes made the protest from which was derived the name of Protestants. There are manufactories of candles and tobacco, and some trade is carried on.—Spire was anciently a Roman military station, and is believed to have contained a Christian community in the latter part of the 2d century; about 300 it became the see of a bishop. It was one of the residences of the emperors of Germany, and a seat of the diet from the time of Charlemagne. Its population was then about 3 times what it is at present, and it had an extensive trade. It began to decline in the 17th century, and Louis XIV., having obtained possession of it in 1689, laid the greater part of it in ruins. It was laid waste a second time by the French in 1794, who held it till 1814; after the peace it was made over to Bavaria.

**SPIRIT OF SALT.** See **HYDROCHLORIC ACID**.

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